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THE ALBUMINURIA AND THE BRIGHT'S DISEASE OF URIC ACID AND OF OXALURIA.[1]

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The more we study albuminuria and Bright's disease the more we are struck with variations from the ordinary type, and the more evident it becomes that advancing knowledge will separate still other groups than those with which we are at present acquainted. By their study we may learn that they not only have distinctive origins, but lead to significant pathological changes, and manifest themselves, even early, by recognizable clinical features. One of these groups that has attracted my attention for some years, and that is very inadequately known, is the one originating in excessive uric acid formation or in oxaluria, and it is to this group that I here desire to call particular attention, and to examine, in the light of experience with a number of cases watched for long periods, the beginning of the malady, the pathological conditions produced, the special signs which distinguish it, and the treatment that is most helpful.

It may best illustrate my meaning if I first describe a few cases that taught me the value of this kind of research, and that familiarized me with the differences which these particular forms of albuminuria and

[1] The groundwork of an address delivered before the Pathological Society of Philadelphia, October 27, 1892.

Bright's disease possess. One of the most striking of these cases may be briefly told:

CASE I.—A well-known professional man consulted me about four years ago, suffering from indigestion, marked flatulence, and constipation. He was very nervous, much alarmed about himself, and greatly annoyed by an irritability of the bladder. Albumin was found in small quantities in the urine, as were tube-casts of hyaline character. The albumin was most marked in the afternoon urine. Repeated examinations showed much the same thing, except that on one occasion hyaline and a few epithelial casts were seen without albumin being detected. The acid urine, the specific gravity of which was never below 1022, and frequently upward, often deposited quantities of brickdust. Extremely heavy sediments were noticed after drinking a glass of beer in the evening. The patient was very nervous about himself and despondent, and all work became irksome. A European trip and a carefully regulated diet, largely lessening the nitrogenized substances, did him great good. For two years there has been no trace of albumin in the urine. Previous to its disappearance, it was only detected by the turbidity with acetic acid and boiling, and was not found by nitric acid. In an examination made fourteen months ago by a professional chemist who had previously repeatedly found albumin, the urine is spoken of as intensely acid, as containing excessive amounts of uric acid, but without a trace of albumin or of sugar.

The patient consulted me recently again, being much annoyed by irritability of the heart and pulsation of the abdominal aorta. I found no organic disease of either. The second sound of the heart was sharply defined, the temporal arteries were full and prominent, suggesting atheroma; indeed, I had so noticed them before, but the pulse did not indicate this, being small and of doubtfully increased tension. His nervous system was again disordered; he had many of the nervous symptoms of lithæmia. He dreaded going into crowds and coming into contact with people, and was much disturbed about his own condition. The urine was intensely acid, depositing urates, but it did not contain a trace of albumin, not even when boiled with acetic acid. The irritability of the bladder had passed away. Strict diet, chiefly of vegetables and milk, is again doing good. He is keeping the urine free by the use of Poland water or of Londonderry Lithia, and is taking systematic exercise in the open air. The circulation is being controlled by aconite, and his improvement is very marked.

In the case to follow, the symptoms were so much like those of ordinary Bright's disease, from which the patient supposed himself to be suffering, and the albuminuria was at first so decided and so persistent that it was only by a close study of the symptoms for some time that their true meaning was discerned.

CASE II.—J. H. M., about forty-five years of age, suffered at one time from irritability of the bladder, due to a stricture which Dr. Keen cured by dilating. When first seen by Dr. Keen, who subsequently referred the case to me, the urine was found to be normal. Mr. M. was a very nervous man, greatly troubled with flatulent dyspepsia; indeed, his chief annoyance was the constant belching and the intestinal rumbling. He

was also a most pronounced neurasthenic, easily depressed, and dreading greatly enlargement of the prostate gland, which, however, was not found to exist. Early in December, 1890, albumin was detected in the urine, of which an accurate examination was made, at Dr. Keen's request, by Dr. Coplin, with the result of finding marked amounts of albumin with hyaline and epithelial casts in an acid urine of higher specific gravity than normal, and exhibiting abundant evidence of crystalline excretion. I placed him on a strictly regulated diet, largely of milk and such green vegetables as he could digest, gave him occasional laxatives, directed the use of Poland water, and, off and on, he also took Basham's mixture. He slowly improved, the amount of albumin lessening and the specific gravity decreasing. A useful prescription proved to be papoid and soda, under which the intestinal indigestion and flatulency were greatly improved, so much so that he himself became encouraged. Further improvement took place by a visit to Capon Springs in the summer, during which he passed large quantities of reddish sand, as he called it. He never had dropsy.

About a year after I first saw him there was no albumin to be found in the urine on several tests. In truth, he felt himself so much better that he stopped his visits during the winter, keeping up in the main, however, his diet. He was never entirely free from his dyspeptic symptoms.

In April, 1892, he saw me again, having been subjected to very confining work, and being much annoyed by the belching and the other gastro-intestinal symptoms. His tongue was coated; he was constipated, and was once more very nervous. But an examination of the urine showed that his kidneys were not much deranged. There was, it is true, some deposit of urates, yet only the faintest trace of albumin, none at all with nitric acid, the slightest turbidity on boiling with acetic acid, and a very faint cloudiness when tested with picric acid. I put him again on a stricter diet than he had been lately following, and more like that which had been originally directed; ordered him phosphate of sodium and light diuretic waters, and insisted on systematic exercise. He again decidedly improved, and when I saw him in October not the slightest trace of albumin could be found in the urine either with nitric acid or with picric acid, or boiled with acetic acid. The urine was acid, its specific gravity 1020. He was still troubled with flatulency, but not nearly so much, and he made the remark that when he was so disturbed his head felt free and he was able to work better.

We see, then, in these cases the symptoms of a malady in which digestive disorder occurs, and in which the disturbed nutrition manifests itself in the urine chiefly by the high specific gravity, the urates, and the presence of albumin and casts that are commonly thought to indicate Bright's disease. We frequently also have some body waste, indisposition to physical and mental exertion, fatigue easily induced, an intermittent pulse, cold extremities; and, from the side of the nervous system, the gloom, the despondency, the irritability of temper met with in lithæmics. Headache, too, and vertigo, may be encountered, though they are far from constant.

I shall now group a set of cases alongside of those just described, in

which it is not so much uric acid and urates that we find, as oxalates. The symptoms are in the main the same. But we often have more intestinal indigestion, with very marked flatulency, and there is apt to be even a greater amount of nervous depression. We have, in truth, all the well-known symptoms of oxaluria that betray themselves not only in the digestion, but in the nervous system. Otherwise we find the same high specific gravity of the urine, with the deposit of oxalates in place of urates, although occasionally they are intermixed, and we obtain the same results from sustained treatment, though more slowly. As I have given some illustrations of uric acid disorder leading to kidney complaint simulating Bright's disease, I shall add a few cases as illustrations of the oxaluria that leads to kindred affection. Case III. is a striking instance in a scholarly gentleman from Boston, and valuable because many of the analyses were made with great minuteness by the distinguished professor of medical chemistry at Harvard.

Case III.—Mr. W., thirty-five years of age, has not been in good health since a college student in 1883. He has had frequent attacks of nausea and dizziness, and, at times, staggering gait; the latter symptom, however, did not appear markedly until June, 1888. He also complained of numbness in the fingers on the right side, and of headache. His eyes were closely examined, but no sufficient cause was found for the attacks, nor for the headaches. He had occasionally distinct seizures of vertigo, and a pain at the base of the brain. The digestive symptoms were very marked, with loss of flesh, flatulency, and, at times, great mental depression. The urine analyzed in 1889 by Professor Wood, of Harvard, showed a great excess of uric acid and of urea, also oxalates and small quantities of albumin, but no sugar.

The urinary condition was much improved by living strictly on milk and Vals water. He took on an average three quarts of milk daily, and for a time the albumin disappeared. Indeed, a report in July, 1889, speaks of its absence as well as of the absence of casts, and only of its increased acidity and of the large proportion of urates. But the absence of albumin in the urine, even at this period, was not constant, for five reports of urinary analysis from the Harvard laboratory, made between March 12, 1889, and October 5, 1889, record albumin. They show acid reaction, increased urea and uric acid, albumin very slight, sugar and bile pigment absent, specific gravity 1027 to 1015 (1015 last examination), chlorides normal, earthy phosphates variable, alkaline phosphates normal or increased; considerable sediment exhibiting at different times excess of mucus, spermatozoa, calcic oxalate crystals, microscopic concretions, acid urate of sodium crystals, urethral epithelium, cells from prostatic region, an occasional blood globule, and renal casts with renal cells adherent, leucocytes, small round fatty cells; in night urine in some specimens casts from the straight tubules with renal cells adherent.

Further symptoms of the case noted were a feeling of constant chilliness, attacks of vomiting lasting sometimes ten days, occasional but not frequent headache, and good knee-jerks. The first sound of the heart was weak, but there was no organic disease. The bowels as a rule were

constipated. Under strict diet, laxatives, and exercise in the open air, his whole condition improved very much.

Early in 1891 the symptoms became again more severe, the indigestion was once more marked, and the attacks of vertigo and the periodic attacks of vomiting returned, especially if his uncertain appetite had tempted him to eat freely for some days. There was extreme sensitiveness to cold water, and a feeling of hunger causing faintness. Insomnia and a sensation of cold, particularly at night, were very distressing. A urinary examination in February, 1891, records the urine as slightly acid, the specific gravity 1025, no sugar, small amounts of albumin, normal phosphates, normal urates, many large and small crystals of oxalate of calcium, and several epithelial and granular casts with some hyaline casts. He was directed to drink Poland and Saratoga Vichy freely, to take as a laxative Carlsbad salts, and to avoid sugars in his diet, and for a time also meats. He took chloride of ammonium, ten grains, three times a day.

Gradually, but particularly after a strict diet, largely of vegetables and milk—to meat he himself had taken a distaste—living in the open air, and keeping up a course of laxatives, his digestive symptoms greatly improved, and all the oxalates disappeared from the urine, and with them the albumin, so that, while he remained a nervous man and often hypochondriacal, he regained his health, certainly as regards the kidney affection. For over a year there have been no tube-casts and no trace of albumin. The specific gravity in an examination of the urine, made in January, 1892, was recorded as 1015, the chlorides were normal, phosphates normal, urates normal; some epithelium from the kidneys and bladder, and amorphous urates were found, but no albumin and no sugar, no casts or blood corpuscles.

Having seen instances like this and bearing them in mind, I have been able of late years to diagnosticate them readily. I have twice within the last year, in cases that happened to be brought to me by the same physician, Dr. MacCuen Smith, recognized this particular form of albuminuria and told the patients that they would recover, as has fortunately proved to be a correct opinion. It may not be without interest to describe these cases, as they are very illustrative:

Case IV.—M. A. H., forty-two years of age, had influenza in 1889, and has not been in good health since. He has been losing flesh, and has been much troubled with giddy spells. When first examined in November, 1891, the tongue was found to be slightly coated, the breath heavy; the bowels were regular. He had a compressible pulse, a short feeble first sound, no headache, felt very listless and languid, was easily fatigued, and subject to attacks of great mental depression. A dry cough existed. The urine was noted to be of specific gravity 1030, acid, to contain small quantities of albumin, but no bile or sugar. In the sediment granular casts were detected, vesical epithelium and granular débris and oxalates, but no oil, no blood, and no pus. He was placed on Rochelle salts as a morning laxative, directed to take Saratoga Vichy, to abstain from sweets, to use only moderate amounts of meat, and to live on green vegetables, fish, and oysters. He also took from time to time courses of two-drachm doses of Basham's mixture. Ex-

ercise was urged upon him. He began to feel so much better by living more in the open air that he gave up his business, and now he is a completely well man. The urine has become normal, has no trace of albumin or oxalates; he is in good spirits and considers himself in excellent health.

CASE V.—The case of B. T. M., seen in May, 1891, presented similar features. The symptoms of indigestion were very marked; the least exertion, mental or physical, produced great exhaustion, and he, too, had periods of great mental depression. The urine was of high specific gravity, and contained oxalates and albumin. Under treatment similar to that in the preceding case, both oxalates and the albumin disappeared. The urine, frequently examined for eleven months, showed neither oxalates nor albumin. In July of 1892, after considerable worry for ten days, both calcium oxalates and a trace of albumin reappeared; but a more active return to the treatment, which had been almost suspended, caused these to disappear, and Mr. M. expresses himself now as feeling better than he has done for twenty years.

From the general tenor of the cases the form of albuminuria with its particular features will have become apparent. Nevertheless, it will conduce to accuracy if the most striking of these be fully examined. First, of the dyspeptic symptoms. These are rarely absent, though sometimes they are very slight. The signs of intestinal indigestion with flatulency and stools of changed color are more common than the evidences of gastric disorder. Lack of appetite or capricious appetite is, however, not unusually complained of, as well as a feeling of fulness after taking food. The circulation is prone to be irregular, sometimes rapid, sometimes slow. The pulse is often weak and faltering, or intermittent. Rigidity of arteries, or even increased tension, which is said to belong to the uric acid diathesis as well as to the contracted kidney, I have very rarely noted. The hypertrophies and other cardiac lesions of Bright's disease are conspicuously absent. The same may be said of dropsy and of the eye lesions. Of neither of these have I observed a single instance. A symptom worthy of note is the slight rise of temperature, particularly in the afternoon; and this teaches us to think of what the kidneys are excreting when we try to explain those slight but long-continued elevations of temperature, seemingly causeless, that we sometimes meet with. The prominence of the nervous symptoms is always very evident. Listlessness, fatigue on the least bodily or mental exertion, forgetfulness, headache, melancholy, sleeplessness, giddiness, may be severally, or may be all, encountered.

The characters of the urine are very significant. There is first the high specific gravity in a urine that is about the normal amount or a little scantier than normal. The specific gravity generally ranges between 1022 and 1028, but I have known it persistent at 1036. The urine, on standing, often deposits urates, sometimes even uric acid, very often mucus. In the deposit, in place of urates, or alternating with

them, we may find with the microscope very many of the crystals of oxalate of calcium. The uric acid does not necessarily manifest itself by the deposits of urates. It is best to determine it chemically. This is done most readily by Haycraft's process. It is not always in excess in cases which have all the other characteristics of the group under discussion; but these are generally the oxalurics.

The total solids are increased. The salts in the urine other than the urates are in normal proportion, or vary but little; at times the chlorides are increased, and not diminished, as they are persistently in contracting kidney—a point to which Dr. Wolff, who made for me many of the analyses on which these remarks are founded, called my attention. The phosphates are normal or increased; urea is not deficient; it is of normal amount or increased. The relation of the urea to the uric acid is various. If we take the standard which Haig has established for uric acid, as 1 of the acid to 33 of urea, this proportion may be found to be unaltered, or the uric acid even relatively increased. In the cases with oxalates, the excretion of urea is usually much augmented.

The amount of albumin is generally small, but it varies much with the time of day. I found it mostly in the morning urine, or in the urine after breakfast; and with the ordinary tests it is at times absent, especially in the evening urine. But here, as in other cases of so-called intermittent albuminuria, there is this fallacy: The albumin is not really absent, but only greatly diminished; for it may often still be detected by the finer tests, such as by slightly acidulating the urine with acetic acid and then using picric acid, or by Tanret's test, or by the metaphosphoric acid test. It is not unusual for the albumin to be accidentally discovered, either by examination for life insurance (Case VII.), or by chemists testing their own urine for comparison. I have known such instances; in one, the urine was tested as a control experiment in the use of metaphosphoric acid. There has now been no albumin present for over a year, though there are still oxalates.

Casts are scanty or altogether absent. In character they are hyaline, or epithelial, rarely markedly granular, never fatty. In a few instances (as in Cases III. and VII.) fatty cells have been reported as occasionally existing. Casts and albumin mostly go together. Yet I watched a case for ten years in which for a long period hyaline and epithelial casts were very often found in the urine of a gentleman suffering much from oxaluria, without any of the tests by heat or by nitric acid finding a trace of albumin. This case came under my observation before I had learned to employ any of the finer tests for albumin. Complete recovery took place, and ultimately death occurred from an affection of the liver.

When now we come to the question of diagnosis, we find the main difficulty is undoubtedly that there are cases of contracted kidney with

most obscure beginnings, cases in which the amount of albumin is extremely small and at first intermittent, and so often absent that, as in one instance that was finally brought to the post-mortem table and found to have contracted kidneys, albumin was only noticed once in eight examinations.[1] But even in such cases we have the low specific gravity of the urine of the contracting kidney to guide us, and we do not observe the crippled organ passing off abundantly urea, urates, or oxalates; indeed, the urea is often much diminished. In advanced cases there is no difficulty in the differentiation. The retinal changes, the heart symptoms, with the low specific gravity of the urine in contracted kidney, are strikingly different. On this I cannot dwell too much. I have yet to see the first instance of the kind of albuminuria to which I am calling attention, in which the specific gravity was persistently low. To high arterial tension we must not attach too much importance as a means of distinction; for it also occurs from uric acid in the blood.

Another form of albuminuria that it may be difficult to distinguish from this albuminuria of mal-assimilation, is the dietetic albuminuria. Now, in point of fact, a number of the reported instances of the latter are really not instances of dietetic albuminuria at all, but belong to the group under discussion, although they are not so recognized. In true dietetic albuminuria the albumin is only found in the urine when certain articles of food are taken, generally in immoderate amounts, such as cheese, eggs, or pastry. This albuminuria, too, has its special periods; it is particularly common after breakfast or a mid-day meal. It only occurs after the ingestion of food, and then very quickly, and, as the cases of Grainger Stewart[2] prove, it is worse after mental excitement and exercise, and is unattended by tube-casts. Very significant is it that the albumin is never found in the urine before breakfast, and that the albuminuria lacks the signs of disorder of the nervous system; significant, too, is the high specific gravity of the urine with the attending persistency of urates or oxalates.

The albuminuria of severe exercise, with which we have become familiar through the observations of Grainger Stewart[3] on football-players and on soldiers, and through the critical analysis of Senator,[4] is discriminated from the albuminuria of perverted nutrition we are endeavoring to elucidate by its occurring only after strenuous exertion, and by the absence of all other symptoms as regards the digestive state and the nervous system. Undoubtedly, violent exercise will also in the albuminuria under discussion increase the amount of albumin tem-

[1] Brennan: New York Medical Journal, July 4, 1891.
[2] Lectures on Albuminuria, 1888.
[3] Ibid.
[4] Die Albuminurie, 1890.

porarily. But it does not do so in a distinctive or peculiarly striking manner; and, the strain over, the abnormal ingredient shows itself in its usual way.

One more point let me mention in the diagnosis of the albuminuria of uric acid and of oxaluria. We must be careful, when we obtain reactions showing but traces of albumin, to be sure that it is really albumin and not mucin we are encountering; for the amount of mucus in the heavily loaded urine is often very great. With reference to the kind of albumin that is discharged, it is, I believe, serum albumin. But whether it may not be mixed with globulin, or this preponderate, is a matter for future chemical research, as well as in how far peptones also occur and become a source of error.

The form of albuminuria under consideration may be met with at any age. It is rare among children or old persons. It is common in growing boys. It affects the sexes in an extraordinary disproportion. Bright's disease, as is well known, is much more usual in men than in women. But in the albuminuria and the Bright's disease of uric acid or of oxaluria the difference is still more striking. In the many instances I have met with there is but one woman, now a young married woman, who had had the disorder for some years and was cured by going to Carlsbad. Even her case was not entirely free from uncertainty, as there had been a severe attack of scarlet fever a few years before the albuminuria was discovered. Still, irrespective of this case, I cannot doubt that the disease may occur in women; for some of the reported cases of intermittent albuminuria in women, as, for instance, the cases spoken of by Dubreuilh,[1] admit best of this interpretation.

I have just mentioned the frequent occurrence of the disorder in boys. Indeed, since I have been studying the subject, I have become convinced that the albuminuria of adolescence, the form so common at or for some years after the age of puberty, is in the majority of instances the albuminuria of uric acid and of oxaluria. Long before I understood this disease I was struck with the fact that the albuminuria of adolescence showed marked debility, digestive disorder, albumin in varying amounts, mostly small, urine of high specific gravity abounding in urates or in oxalates, or in both. The intermittent character of the albuminuria and the sparse tube-casts are also very suggestive. Let me add that I believe most of the so-called intermittent albuminurias, or functional or cyclic albuminurias—for such are the many names given to the same disorder in which albumin unconnected with a real disease of the kidney appears at certain periods in the urine—whether they occur in adults or in young persons, to be also instances of this kind of albuminuria, and that it is the tissue-waste, with its uric acid or oxalates, which causes in

[1] Revue de Médecine, 1887, vii.

its excretion temporary disturbance of the kidneys. Is not also the so-called physiological albuminuria of similar origin? And does not the irritation of the kidney from the excretion of the tissue-waste have as much to do even with the albuminuria after forced exercise, seen in the contests of pedestrians or in soldiers, as the altered blood-pressure and active congestion the exercise produces? It may be, then, that, studied in the light of attending tissue-waste and disordered nutrition, more or less permanent, all these forms of albuminuria will receive a new meaning.

It is not my purpose to examine here into these different types of functional albuminuria further than is necessary to connect them with the object of this paper. But there is one point that experience has taught me which it may not be without value to mention. The cases of intermittent albuminuria in adolescents have been supposed to be due to a weak circulation which attends the languor and listlessness in some of the boys it affects. I cannot think that any disordered flow of blood in the renal vessels from weakness is the true cause. Indeed, one of the most typical illustrations of the malady I have known was in a college student with hypertrophy of the heart and slight mitral disease, with whose case I have been familiar since his childhood. The circulation has been always over-active.

CASE VI.—B. W., aged nineteen, a student at Yale, has had, for years, hypertrophy of the heart with mitral regurgitation, which followed rheumatic fever in 1883. Examinations of the urine had shown nothing abnormal to exist until January, 1892, when he saw me on account of frequent nose-bleeding. His tongue was somewhat coated; he did not complain of headache; the heart's action was about the same as usual, though the pulse was not quite so strong; he expressed himself as not feeling vigorous. The heart's impulse was still forcible, and indicative of the hypertrophied condition. I found albumin in his urine, and a subsequent examination of the evening and morning urine, made by Dr. Wolff, gave these results:

	Morning.	Night.
Appearance	Clear	Clear
Color	Yellow	Yellow
Reaction	Acid	Acid
Specific gravity	1030	1032
Total solids	6 per cent.	6.3 per cent.
Urea	2.8 per cent.	2.6 per cent.
Chlorides	1.7 per cent.	1.6 per cent.
Albumin	Faint traces.	Traces.
Sugar	None	None
Sediment by microscopical examination	Calcium oxalate copious.	Calcium oxalate copious.

In a number of specimens examined no casts could be detected. The enormous amount of crystals of oxalate of calcium pointed to the incomplete suboxidation that was going on. The urea, it is seen, was below the proportion of total solids, and below the proportion of the chlorides.

The patient was placed upon muriatic acid, laxatives, and diuretic waters, at first Buffalo Lithia, and subsequently Poland water. He was restricted in sugars and meats, and was allowed to take moderate exercise. On the 15th of January no albumin could be detected in the morning urine. On the 19th of February the specific gravity of the evening urine was 1038, and there were heavy deposits of urates and small quantities of albumin. In the morning urine of February 20th, the specific gravity was 1030, the urine was acid, and no traces of albumin could be found by boiling with acetic acid, or by the nitric acid contact test, or by picric acid dropped into urine acidulated with acetic acid and boiled. From this time on, a number of examinations of the urine showed no albumin. The treatment was, in the main, kept up, occasional short courses of Basham's mixture substituting the muriatic acid. The diet was adhered to, and he was allowed moderate amounts of milk. A gradual improvement took place; the specific gravity decreased, though in several specimens it was still 1026; and since March 23d, while oxalates and urates have been found at times, there has been no albumin, and he has felt well. The last examination of September 26th proved him to be in good health, and he shortly after resumed his work at college.

The prognosis is favorable, though the cases may be of long duration, lasting several years, with occasional reappearance of the albumin in the urine. When recovery takes place, which I think is almost invariable under proper treatment, and albumin and casts have long ceased, it is not unusual for small cells still to be found with the microscope in the urinary sediment, very likely incompletely formed cells from the tubules of the kidney. Yet I believe that occasionally, from very long continuance of the disorder, fibroid changes may take place and interstitial nephritis result. Notwithstanding some doubts that suggest themselves, owing to the history, I think this to be a case in point.

Case VII.—Mr. C. L., fifty-three years of age, a manufacturer, became aware of having a renal disease on applying to a life insurance company in June, 1882. His application was refused on account of albuminuria. Except that he was tired from strenuous attention to business, and was a dyspeptic, he regarded himself as in perfect health. The discovery of albumin in his urine led him to put himself under treatment, and to retire from business. He was actuated partly in this by the fact that he had lost two brothers by Bright's disease. In March, 1883, as the records of a very accomplished physician in Richmond, who examined him, show, he was suffering a great deal with lassitude and general depression, and complained of pain in the back and head, indistinctness of vision, and was rheumatic. The urine at that time had a specific gravity of 1020, the amount voided in the twenty-four hours being forty ounces, and contained 6 per cent. of albumin by measure; no sugar, but granular casts, torulæ, and fat-cells. It was acid, and showed 320 grains of phosphates in the forty ounces; the urates were not determined. By June 11, 1883, the patient being under treatment, the albumin as well as torulæ had entirely disappeared; so had the casts, and the phosphates were normal; the specific gravity was 1014.

The urine, in March, 1886, examined by the same physician, is recorded as having one-seventh per cent. of albumin by measure or bulk, and again granular casts; and to be of specific gravity 1014, and acid. The phosphates were half a grain to the drachm.

Mr. L. subsequently went abroad and consulted a very eminent London physician, who looked upon his case as one of albuminuria largely due to nervous injury and indigestion, and to renal gravel. His analysis shows the urine to have been of specific gravity 1016, acid, normal in urohematin, in oxalic acid, in hippuric acid, in hydrochloric acid, in sulphuric acid, but with an excess of uric acid and of phosphoric acid; there were no bile acids. There was a little albumin. There was none in the urine at 8 A.M.; some was found at 11 A.M.; at 10 P.M. it was again absent. Under the microscope torulæ were detected, but no casts. The urine, examined several times after this record, showed no albumin or casts, but always torulæ. The patient's health had improved very much under diet and treatment for his indigestion.

Mr. L. consulted me September 27th, of this year, on account of severe headache coming in spells in the morning, and great annoyance from flatulency. The bowels were slightly costive, the tongue lightly coated; he complained of pain over the left kidney. The pulse was 80, of rather high tension, but the second sound was not accentuated, nor was there cardiac hypertrophy. A urinary examination showed the urine to be of specific gravity 1013, to contain a trace of albumin, a deficiency of urea, no sugar and no casts, though a good many epithelial cells were found. He was placed on a diet chiefly of milk, green vegetables, and fruit. Phosphate of sodium was given to him in the morning, and, subsequently, ten drops of dilute muriatic acid three times a day. His digestion improved decidedly under this treatment, and the headaches lessened greatly, yet an examination of the urine on October 20th still showed albumin, quite well marked with the picric acid test, and the nitric acid ring test. A subsequent and careful analysis by Dr. Wolff gave in the urine of a total quantity of 64 ounces in a day, the following:

Total quantity as given, 64 ounces (normal 48 ounces); appearance, slightly cloudy; color, yellow; odor, normal; reaction, very acid; specific gravity, 1015; total solids, 3 per cent. = 960 grains in twenty-four hours (by Vogel, normal 930 grains); urea, 1.7 per cent. = 518 grains in twenty-four hours (by Vogel, normal 542 grains); uric acid by Haycraft, 0.141 per cent., in twenty-four hours 43.2 grains (normal, 11.7 grains); chlorides (as NaCl) = 0.68 per cent., in twenty-four hours 206.4 grains (normal, 255 grains); albumin (computed dry) in twenty-four hours, 7.6 grains; sugar, none; sediment consisted of epithelial cells (bladder), also a few leukocytes and red corpuscles.

This proves that there is little, if any, diminution of urea, but a marked diminution of the chlorides. The uric acid, as determined by Haycraft's method, is about three times the normal amount, and the ratio of the urea is as 12 to 1, which is a great increase, if we accept the estimate of Haig as to 33 to 1 being the norm. The sediment consists of epithelial cells from the bladder, also of a few leukocytes and red corpuscles, but no casts are detected.

What is the pathological state that gives rise to the albuminuria of uric acid and of oxaluria? I think essentially a congestion of the

kidney, with, should the hyperæmia persist, slight local inflammatory changes in the vascular cortex from the irritating effects of excreting increased amounts of ill-formed or broken-down tissue in the shape of urea, urates, or these imperfectly oxidized, as oxalates. In other words, the primary fault is not in the kidneys, though the kidneys suffer because they have to throw off the irritating waste products. Anything that lowers vitality and disturbs the nervous system may increase the faulty assimilation, and, with it, the irritation and congestion which produce the albuminuria. The question whether this kind of albuminuria ever passes into true organic affection of the kidney has been already considered. I believe this to be possible, but of extremely rare occurrence, and, when it happens, to be brought about by the constant irritation leading to slow fibroid changes, and gradually developing interstitial nephritis. It is held by some that all, certainly most, cases of Bright's disease originate in uric acid excess acting locally. This view seems to me too sweeping, for, even for the production of the gouty contracted kidney in which we have uric acid playing so important a part, we have other elements to take into account—the general changes that occur in the body, the state of the abdominal ganglia, and the condition of the arteries, which, in the various relations of Bright's disease, have been so admirably described by Gull and Sutton and by Arthur Meigs.

In the treatment of the albuminuria of uric acid and of oxaluria we must bear in mind that we are dealing with a special disease, one in which mal-assimilation is the main element, and the kidney affection only a conspicuous expression. The treatment must not be, therefore, purely that of Bright's disease, as we commonly meet with it, but largely that of the underlying state, a state chiefly one we are familiar with as lithæmia, or as oxaluria. The lines of treatment are, it is true, in the main parallel. Thus it is just as essential in this form of albuminuria as in the ordinary forms of Bright's disease to lessen the work of the kidneys by calling the various emunctories into play. Nay, it is more essential, for the kidneys have not only usual work, but largely more than their share of work thrown on them; and it is this extra work that leads to their damage. Their labor can be much lessened, and the blood condition and the character of the excretions altered, by close attention to diet—which is, in the main, also that of Bright's disease, though it is stricter as regards the ordinary carbohydrates, and, on the other hand, does not insist so much on milk. Vegetables, especially the green vegetables, and fruits are freely allowed; tea, coffee, and cocoa are permitted, if sweetened but slightly; so are limited amounts of oatmeal, of buckwheat and corn cakes, of rice, of bread and butter; and so are oysters and fish. The white meat of poultry and of game may be moderately taken, but the meats containing much nitrogen,

such as mutton and beef, ought, as a rule, to be avoided. I find, however, where considerable exercise is indulged in, particularly by growing boys, that meats may be eaten in restricted amounts without disadvantage. Milk I do not find especially useful, and direct only a pint or two daily. It is, indeed, quite unnecessary to confine the patients to a milk diet, as is so often done, and done with advantage, in the usual nephritic kinds of Bright's disease. In fact, I have known an instance where a permanent cure was effected on a vegetable diet, in which an exclusive milk diet had left the urine still albuminous. Eggs need not be forbidden, if they be not taken constantly, and if the yellow rather than the white be eaten. As regards sugars, I am always strict, for I have too often noticed how they aggravate the symptoms in lithæmics. Beets, for the same reason, are forbidden. Among vegetables, too, I never allow the rhubarb plant, for I have observed, after its use, oxalates, and with them albumin reappear. Salt may be always freely taken.

It is, as in all forms of albuminuria, important to keep the kidneys flushed. The free use of pure water, plain or aërated as fancy dictates, and of the mild diuretic waters, such as Poland water, Saratoga Vichy water, or Vichy water, is always of service. Drinking hot water at bedtime acts in some persons very beneficially as a diuretic, and gives a copious flow of urine in the morning—doubly serviceable then, for Roberts and other observers have shown that uric acid is largely excreted during the morning hours. Drinking fluids before or soon after breakfast is valuable for the same reason. Alcoholic drinks ought, as a rule, to be avoided, or, if used, to be restricted to light wines, not acid. Beer is forbidden.

The use of baths, not too cold, followed by systematic skin friction, is clearly indicated; and of the value of exercise in the open air I have seen many striking examples. As long as it is not excessive and too long continued, it does good service. It helps to oxidize the food-stuffs as well as the waste products, and produces free action of the skin. Far from increasing the albumin, as violent exertion will, it diminishes it. I learned this lesson from experience. I examined the urine of a young man that was albuminous in the morning, and, after his taking a horseback ride in the forenoon, the albumin had disappeared. The good results seen from life in the open air led to the inquiry whether mountain air was beneficial, even in high altitudes. I have found it so, unlike what we so often notice in the ordinary varieties of Bright's disease. The urine improves, and the albumin may, for the time, cease to be voided. Sea air does the general health good, but sea-bathing I have known to increase the albuminuria, as has also been observed for other forms of the disease. Cold douches to the spine I have not systematically tried. Grainger Stewart speaks of their causing the albumin

to disappear in dietetic albuminuria. It is, I think, important that the patient should not make much exertion in the early part of the day. In one of Clement Dukes' very instructive papers on "The Albuminuria of Adolescents"[1]—a form which I have already cited as belonging, I think, in the main, to the group I am here describing—he mentions as a significant sign that boys affected with it fainted when obliged to stand during morning prayers in chapel. Young people who have the complaint ought not to be pushed in their studies. It is in them an expression of a disturbed development of the growing organism; an expression of weakness of nerve force, and of poor assimilation during growth.

Among medicines, laxatives are very important—phosphate of sodium, cream of tartar, Rochelle salt. An occasional blue pill, or a grain or two of calomel preceding the saline, is also to be recommended. So is a course of muriate of ammonia, or of iron, from time to time—iron, in the shape preferably of the tartrate of iron and potassium, or of Basham's mixture. In the cases with oxalates, nitro-muriatic acid remains a standard remedy, and Haig,[2] in his recent very interesting work, strongly urges acid as clearing the blood of uric acid. We must not in any case overlook the heart. The heavy work thrown on the kidneys, the general ill-nutrition which comes from the poorly oxidized elements circulating in the blood, and the lowered nerve force, disturb the heart, and the irregularity it exhibits may have to be met by digitalis or strychnine. The inhalation of oxygen has suggested itself, but I have not as yet used it sufficiently to be sure of its distinct therapeutic value.

The treatment has been described in this paper at some length, because we have it in our power to make this treatment effective, and, by applying it to a form of albuminuria that can be clearly recognized, to rescue cases which otherwise might really swell the list of Bright's disease, with the dreaded name of which they are commonly labelled.

TENOTOMY BY THE OLD METHOD.

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Judged by the simplest surgical principles, it would appear that the division of a shortened tendon or of a contracted band of fascia could best be accomplished by exposing it through an incision in the skin, by

[1] London Lancet, December, 1891.
[2] Uric Acid as a Factor in the Causation of Disease, 1892.

isolating it, and then by cutting it with the least possible injury to the adjacent parts. Such a method was carried out—with some uncouthness, probably—in the early days of tenotomy.

The first operation of tendon division is ascribed to Roonhuysen, of Amsterdam,[1] who severed the sterno-mastoid tendon in 1670. A flap of skin was raised, and the contracted band was then cut "from without inward," as the phraseology goes. One hundred years went by, and surgeons were still found to be following the same method. Ten Haaf[2] operated after this fashion upon the sterno-mastoid tendon toward the close of the eighteenth century, and Sharp[3] is found to be departing but little from the ancient plan when, after exposing the tendon, he passed the knife beneath it and divided it by cutting toward the surface.

The records of the time, however, show that there was some surgical uneasiness about this apparently simple operation. It was seldom performed by the bold, and it was feebly modified by the timid. A certain surgeon, one Minnius,[4] destroyed the skin over the tendon with caustic, and then divided it with scissors. Surgical procedures in this direction do not appear to have descended lower than this. Other operators, with what appears to have been a reckless querulousness, divided the skin and the tendon in one feverish gash, and then apparently waited to know the worst.

The reason of all this was that an open wound was a terror to the conscientious surgeon. Healing by first intention was rare; suppuration was the rule. The dressings applied were to the bacteria of the time what a tropical climate is to vegetation. The fussy attention which gave the wound no prospect of being left alone, and which encouraged the pouring into it of oil and wine, took away the few remaining prospects of success. Surgeons have never been famous for the publication of their failures; but one can imagine the suppuration that took place in the tendon sheaths, the abscesses that ran riot in the connective tissue, the joints that were disorganized, and the limbs that were lost in those picturesque times, when the surgeon wore knee-breeches and a furred cloak, and when aseptic surgery was yet without form and void.

Such was tenotomy by the open method. In course of time it was demonstrated that tendons could be divided without making a large surface incision, and that by means of a small skin puncture and a subcutaneous section of the contracted band, the evils attending the older plan were for the most part avoided.

Delpech[5] laid down the principles of subcutaneous tenotomy as it is

[1] Historische Heilcuren. Nürnberg, 1674.
[2] Abhandlungen aus der Naturgeschichte. Leipzig, 1775, vol. i. p. 262.
[3] Treatise on the Operations of Surgery. London, 1740.
[4] Tulpii, Observationes Medic.
[5] Chirurgie Clinique de Montpellier, 1823, t. i. p. 184.

practised at the present day, but it is remarkable that he himself did not observe the precautions of which he preached, for in dividing the Achilles tendon he made a cut on each side of the tendon one inch in length.

Ashley Cooper[1] employed the subcutaneous method for dealing with contracted fasciæ in the hand, and within a few years, influenced by the practice of Stomeyer and others, subcutaneous tenotomy came to be generally employed.

Now it cannot be ignored that that necessity which led to the invention of the subcutaneous operation no longer exists, and that the circumstances which made the older procedure rash and dangerous have entirely passed away.

It remains to consider whether this excessive caution in dividing a shortened tendon is still admirable, even although it has ceased to be necessary, and whether the operation has special merits which are independent of the conditions which brought it into being.

Should the time ever come when all surgical secrets are unfolded, I think it would be found that the tenotome has many sins to answer for. There would be recorded against it many disastrous cuts in the dark, many cases in which the wrong tendon had been severed and the right one saved, not a few instances of the division of unseen veins, of the outpouring of blood into tendon sheaths, of the pricking of arteries and the cutting of nerves.

It is a good rule in surgery that the surgeon's blade should reach no farther than his eye can follow it, that every cut should be made with the utmost precision, and that the scalpel should be free from all speculative movements.

In some cases of tenotomy—as, for example, in dealing with the Achilles tendon—the blade, although hidden from view, can be directed with the greatest exactness; but in other instances the thrust of the knife is a thrust made at a venture, and the procedure lacks that definiteness which should never be wanting in any surgical operation.

In judging between the subcutaneous and the open methods in tenotomy, and in appraising their comparative value, a decision can be made to depend upon the interpretation of two surgical axioms.

The first of these is to the effect that the operation incision should never be larger that the efficient performance of the operation requires, and the second insists that the division, and, if need be, the subsequent separation of the integuments, should be sufficiently free to enable the parts concerned to be well exposed, and to be dealt with with exactness. Here, then, are two extremes. On the one hand, there may be surgeons who will boast that they can ligature the common carotid, or extract

[1] On Dislocations and Fractures; sixth edition, 1829, p. 476.

the ovaries, through an inch incision. Such feats are possible, but they belong rather to legerdemain than to operative surgery; they are curious, but at the same time are both foolish and foolhardy. On the other hand, the worshipper of the free incision will maintain that the size of the skin-wound is of no moment at the present day, and that a free and ready exposure of the operation district is worth any sacrifice. A surgeon so minded may ligature the carotid by a process comparable to that by which the vessel is exposed in the dissecting room, and his abdominal incision may be founded upon the liberal lines observed in the making of post-mortem examinations.

So far as the present subject is concerned the true course lies between these two extremes.

If a tendon can be easily and certainly divided through a small skin puncture, then there can be no reason for employing a larger incision.

In dividing the tendo Achillis I still employ the subcutaneous method, not because a subcutaneous incision is safer, but because the tendon can be quite as well severed through a small incision as through a large.

On the other hand, if the position of the tendon or band be such that its subcutaneous division is attended with the very least uncertainty, then I freely expose it by turning back a suitable flap of skin. By such a procedure the tendon is brought well into view, its sheath can be precisely opened, and its substance precisely divided.

In dealing with a severe case of wry-neck, it appears to me that the subcutaneous method is entirely out of place, and I have observed the plan of exposing the part through a flap, and of then cutting such contracted tissues as need division (and they are not represented solely by the sterno-mastoid tendon) without the least element of speculation or uncertainty.

For some years past I have returned to the older method of tenotomy in the majority of the cases requiring that operation in its widest sense, and have employed the improved or subcutaneous incision in but a comparatively few cases.

The following case will perhaps serve to illustrate some of the remarks just made, and to afford an example of the value of the open method:

A young woman, aged twenty-one years, was admitted into my wards at the London Hospital, on March 10, 1892, with a contraction of the right knee. She was delicate and a member of a tubercular family. The knee had been the seat of tubercular disease which commenced four years ago. The joint was at first swollen, and splints were applied and kept in position for a period of seven months. When these were removed the articulation remained stiff and the patient was unable to use the limb. Fifteen months from the commencement of the disease an abscess appeared in the upper and outer part of the popliteal space. It continued to discharge for a period of six months. The limb became gradually bent. Two years ago a tubercular ulcer formed over

the right malleolus. This gradually extended, and on admission had a diameter of two inches. The patient had not used the limb for about three years. On admission the knee was found to be free from active disease. It was tender and was fixed in the posture of semi-flexion. A sufficient degree of movement was apparent to make it evident that the ankylosis was not osseous. This movement was very insignificant. The young woman was unable to put the foot to the ground. The ulcer was scraped and grafted, and healed readily. The limb was suspended by two bands, one around the ankle and one above the knee, and a slight weight was applied over the joint. No improvement in position followed. A posterior splint was then applied and further attempts made to straighten the limb. An ulcer formed behind the ankle, due to the pressure of the splint, but the deformity remained unchanged. These attempts to correct the false position by mechanical means were maintained from March 10th until May 20th. On May 27th I carried out tenotomy by the open method. The skin of the ham presented scars of the old abscess, and the precise anatomy of the contracted tissues beneath it was very obscure. A rectangular flap of skin which took in the whole of the covering of the popliteal space was fashioned and turned up. The district beneath was well exposed and the various contracted tissues were severed as they were encountered. The semi-membranosus and semi tendinosus tendons were cut, as was also the ilio-tibial band of the fascia lata.

A considerable quantity of cicatricial tissue occupied the popliteal space, and this was cautiously divided to some depth. It appeared to offer the greatest resistance to the straightening of the limb. The biceps tendon was not severed. The knee was brought to the position of full extension without the employment of any force.

The flap was secured in place by sutures and covered by a dry dressing. An anterior metal splint was applied by means of which the limb was suspended.

The wound healed perfectly by first intention and without rise of temperature. On June 2 a simple back splint took the place of the anterior splint, and a little later the limb was put up in plaster and the patient encouraged to once more attempt to walk.

She left the hospital on July 9. She was then able to walk without limping and without a stick or any assistance. The limb was perfectly straight, and a little movement, which was increasing, was observed in the joint.

During the operation it became evident that no series of subcutaneous incisions could have divided all the complex contracted bands, and that such incisions would not have been unattended with risk. By the subcutaneous method the biceps tendon would have been severed without doubt, and after the three great tendons had been divided the limb would possibly have been put straight by force.

The contracted tissues, deep in the ham, would have been roughly torn through by such a measure, and subcutaneous bleeding and recontraction would have very probably resulted. In the operation described no force was employed, and the deformity was corrected by a series of simple incised wounds.

I think it will be allowed that in such a case as this the old method was the safer and surer and the more completely in accord with the first principles of operative surgery.

TUBERCULOUS PERICARDITIS.

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Tuberculosis follows hard upon rheumatic fever as a cause of pericarditis. The affection is usually overlooked clinically, and possibly in some cases anatomically. In 1000 autopsies, the majority of which were made at the Montreal General Hospital, there were 275 cases with tuberculous lesions, in 7 of which the pericardium was involved. Its relative frequency may be gathered from the following figures, furnished by Dr. Welch's records at the Pathological Laboratory of the Johns Hopkins Hospital. Of instances of pericarditis, 6 were tuberculous. Of late years attention has been called to the frequency of its occurrence, and yet the records in the literature are not very numerous; thus, the *Index-Catalogue* contains only thirty references, and the *Index Medicus* to July, 1892, only twenty-seven. The *Transactions* of the Pathological Society of London include but five cases to date.

The following is a brief summary of the cases which have come under my observation in Montreal, Philadelphia, and Baltimore:

Case I.—Female, aged forty-three years; sixteen ounces of dark exudate in pericardium; general miliary tuberculosis.

Case II.—Male, aged five years; caseous masses and fresh villous exudate; miliary tubercles on the peritoneum and in lungs; bronchial and mediastinal glands caseous.

Case III.—Female, aged thirty-eight years; chronic pulmonary tuberculosis; fresh tuberculous pericarditis.

Case IV.—Male, aged sixty-four years; acute tuberculous pericarditis; acute tuberculous pleurisy; chronic pulmonary tuberculosis.

Case V.—Male, aged fifty years; chronic pulmonary tuberculosis; recent tuberculous pericarditis.

Case VI.—Male, aged forty-five years; chronic pulmonary tuberculosis; chronic tuberculous pericarditis.

Case VII.—Male, aged twenty-eight years; chronic pulmonary tuberculosis; tuberculosis of pleura; acute tuberculous pericarditis.

Case VIII.—Mary B., aged thirty-six years; tuberculous pyelitis; fibro-caseous changes at the apices; sixteen ounces of turbid hemorrhagic serum in pericardium; thickening of the layers.

Case IX.—John G., aged fifty years; tuberculous mediastinal

abscess; tuberculous infiltration of parietal layer of pericardium; acute pericarditis.

Case X.—Max S., aged forty-five years; primary tuberculosis of bowels; chronic tuberculous pericarditis, the membranes from three to four lines in thickness; bronchial glands caseous.

Case XI.—Male, aged seventy-two years; death from pneumonia; heart hypertrophied; pericardium adherent, greatly thickened, and tuberculous; calcification of bronchial glands; no other tubercles in body.

Case XII.—John T., aged sixteen years; tuberculous cerebro-spinal meningitis; tuberculosis of mediastinal glands; old tuberculous pericarditis.

Case XIII.—Moses B., aged twenty-four years; tuberculosis of mediastinal glands; chronic tuberculous pericarditis; dilatation of heart; a few tubercles in lung.

Case XIV.—Wm. H. T., aged fifty-two years; dropsy; hypertrophy and dilatation of heart; chronic tuberculous pericarditis; fibroid tubercles in lungs; miliary tubercles in viscera.

Case XV.—John P., aged thirty-eight years; dropsy and dyspnœa; tuberculous pericarditis with effusion; tuberculous pleurisy; old foci in lungs.

Case XVI.—Emma B., colored, aged thirty-nine years; dyspnœa, cough, and anasarca; tuberculous pericarditis, with effusion; tuberculosis of mediastinal and bronchial glands; scattered tubercles in lungs, liver, and spleen.

Case XVII.—John C., aged sixty-five years, admitted with cough, fever, and signs of consolidation at left base. Death on second day after admission. Chronic pulmonary tuberculosis; fresh tuberculous pneumonia; arterio-sclerosis; patch of recent tuberculous pericarditis.

Etiology.—Tuberculous pericarditis is not limited to any age. The youngest of my cases was a child of five years; the oldest a man of seventy-two years. Parrot, Duckworth, Rolleston and Letulle have reported cases in infants under a year. In Brackmann's Göttingen Thesis, of 65 cases collected from the literature 19 were in children. It does not seem to be at all uncommon in old men, and there are two cases on record in octogenarians. Males seem more prone to the disease than females; there were only four women on my list.

Tuberculous pericarditis is due in a majority of instances to infection of the membrane from caseous mediastinal lymph glands. The disease may be confined to these glands and to the pericardium; thus, in Case XI. of my series, the patient, an old man, aged seventy-two years, died of pneumonia after a short illness. There was no tuberculosis of the lungs or other viscera; the pericardium was thickened, both layers adherent, and presented cheesy masses and gray nodules. The heart was enlarged, weighing seventeen ounces. The mediastinal glands were calcified, particularly the bronchial group. Case IX. is of special interest, showing the mode of extension from the anterior mediastinum to the pericardium. The patient, a man aged fifty years, had pulmonary

tuberculosis, and died of acute tuberculous pleurisy with sero-purulent exudate. Upon the external layer of the pericardium, three and a half inches in extent, was a flattened tuberculous abscess with cheesy and purulent contents. The subjacent pericardium was much thickened, and was itself cheesy, and inflammation had extended through and produced an acute fibrinous inflammation of both layers with very little fluid exudation. Tubercles could not be seen. This association of disease of the mediastinal lymph glands with pericarditis has long been recognized. Zenker laid special stress on it in his paper on the traction diverticula of the œsophagus, caused by diseased lymph glands, and of his 54 cases there were 9 instances of total and 1 of partial synechia of the pericardial layers. Of the 101 instances of disease of the lymph glands of the mediastinum, collected by Berêty, the glands were caseous in the 18 cases in which the pericardium was involved. Kast, who quotes these figures, reports an instance (*Virchow's Archiv*, Bd. xcvi.) of acute tuberculous pericarditis due to perforation of a purulent mediastinal lymph gland into the pericardial sac. In children the affection is in all probability most commonly transmitted in this way from mediastinal and bronchial glands. In Case II., a child aged five years, the bronchial glands were greatly enlarged, projected deeply into the lung tissue, and presented on section a uniform caseous appearance. Both layers of the pericardium were greatly thickened; their adjacent surfaces roughened and irregular; not covered with the usual false exudation, but presenting strands of firm tissue, and flat, slightly elevated caseous masses, which were yellow-white in color, and equally distributed on both layers. There were scattered miliary tubercles in the lung, on the peritoneum, in the kidneys, and in the liver, and these were in all probability entirely secondary to the advanced bronchial and pericardial disease.

A second, less common, mode of extension is from the pleura or from the lung. A very good illustration of this was recently met with in Case XVII., a man aged sixty-five years, who was admitted to ward F of the Johns Hopkins Hospital with acute tuberculous pneumonia, and died on the following day. There was old disease of the lungs, and both acute and chronic tuberculous pleurisy. The left lung was strongly adherent to the pericardium, the cavity of which contained a small amount of clear fluid. The inner surface of the parietal layer was smooth, and presented a number of ecchymoses. At the superior reflection, where it was adherent to the underlying thickened and infiltrated pleura, there was an eruption of fresh gray miliary tubercles.

And, lastly, there are instances in which the pericardium appears to be involved with the pleura and peritoneum in a general tuberculosis of the serous membranes. In some of these cases the extension can be shown to have been directly from the pleura and pericardium into the

peritoneum, while in others it would appear that the extension was from the peritoneum into the serous membranes of the thorax.

MORBID ANATOMY.—The picture is extremely varied. Practically there are two groups of cases: those with firm adhesions between the pericardial layers, usually with great thickening; and those with recent exudation, fibrinous, sero-fibrinous, hemorrhagic, or purulent. The cases with adhesions are the most numerous. Of the 17 cases in my series, 2 cases, Nos. IX. and XVII., may be excluded, as in the first there was only tuberculous infiltration of the parietal layer, and in the other an eruption of fresh miliary tubercles alone. Of the remaining 15 cases, in 6 only was there thickening of the layers without exudation. The statistics, however, of Rousseau (Paris Thesis, 1882) and Lancereaux show that the chronic adhesive form is most common. Of the 35 observations analyzed by the former, in 21 there was adherent pericardium; while in 12 of Lancereaux's 14 cases there were adhesions.

Both layers are, as a rule, uniformly thickened, and in the extreme instances it is impossible to separate them at any point. In other cases the process is more local, and the synechia may be limited to the front of the heart, leaving large portions of the base and of the left auricle free. The reflection of the pericardium at the great vessels and the adjacent mediastinal tissues may be uniformly infiltrated and the vessels surrounded by a solid mass. In Case X. "the layers of the pericardium were adherent and measured six to ten mm. in thickness, and showed groups of tubercles, many of which had fused together in uniform cheesy masses. The tubercles and caseous masses can be readily distinguished in each layer, since between them there is an infiltrated connective tissue which is free from tubercles. At the base of the heart the thickened pericardial layers formed a solid cheesy mass surrounding the aorta."

The membranes may reach a thickness of from three to ten millimetres, the increase being due to the growth in the leaves of tubercles, the development of caseous masses, and to the new growth of connective tissue. Frequently it can be seen that the two enormously thickened layers are united by a clear, infiltrated tissue, which may itself not present any tubercles. In the earlier stages of this process the membranes are little, if at all, thickened, the tubercles are seen just beneath the endothelial layer, and there may or may not be a fresh exudate of yellowish fibrin. In other instances the contiguous surfaces of the thickened layers are covered with flat, yellowish caseous masses, as noted in Case II. Collections of thick cheesy pus are occasionally found between the layers.

The condition of the heart in this chronic adhesive form is most interesting. As is usual in adherent pericardium, particularly when the layers are very thick, there is enlargement of the organ, which may

reach an extreme grade. In Case XIV. the heart with the thickened pericardial membranes weighed thirty-six ounces. At the time of death the cardiac muscle is more or less degenerated, and may show fatty or fibroid changes. The tuberculous process rarely invades the ventricular muscle, though the thin auricle may be much infiltrated, as in Case XV., in which the appendix was converted in great part into cheesy material, only a thin film of muscle substance remaining.

In the cases with effusion there may be—(*a*) a simple plastic exudate similar to that of ordinary rheumatic pericarditis, with little or no serous effusion, and with scarcely any thickening of the membrane, the eruption of miliary tubercles alone indicating the nature of the process. More commonly there is (*b*) extensive sero-fibrinous exudate, consisting of flakes of lymph and a turbid serum. When the process lasts for any length of time, the membranes, as in Cases XV. and XVI., may be very greatly thickened and the anatomical picture may resemble very closely that of a fatal case of rheumatic pericarditis. The tubercles, however, can be seen with distinctness in the membranes, and there are usually flat areas of cheesy infiltration beneath the fibrinous layers. (*c*) In some cases the exudate is hemorrhagic, as in Cases I. and VIII. of my series. The membranes here may be deeply engorged, and hemorrhagic foci may be seen in them. The color of the effusion may be bright red, but is more commonly a reddish-brown or chocolate color. The amount of the effusion may be large, ranging from 500 c.c. to 2000 or 3000 c.c. An instance of most extensive effusion has been reported by Musser, with whom, when his colleague at the Philadelphia Hospital, I had an opportunity of seeing the case. The patient, a colored man, aged twenty, was admitted to the Philadelphia Hospital on the fifth week of an illness characterized by cough, dyspnœa, and irregular chills. There was extreme orthopnœa. There was absolute dulness over the greater part of the left chest from the second rib in front and from the middle of the scapula behind. There was an area of modified tympany along the vertebral column in the infra-scapular region. Thirty-seven ounces of a bloody fluid were aspirated, presumably from the pleural cavity. A distinct friction sound was heard after the aspiration, and it was thought that he had both pleurisy and pericarditis. At the post-mortem the pericardial sac contained sixty-four ounces of bloody serum. There were tubercles in both layers of the pericardium, also in the left pleura. The bronchial glands were enlarged and caseous. And, lastly, (*d*) the effusion may be purulent, and this, too, apparently from the outset and not following paracentesis. The exudation may be enormous, and the cases have been diagnosticated as left-sided empyema. In Kast's case, already referred to, the inflammation was due to perforation of a softened mediastinal lymph gland into the pericardium. No instance of purulent exudate has come under my direct care.

CLINICAL HISTORY.—We may recognize four groups of cases.

First group: Latent tuberculous pericarditis. A considerable number of all the cases on record belong here. The disease is discovered accidentally in individuals who have died of other affections, or of chronic pulmonary tuberculosis. An interesting illustration of this was Case XI., a well-nourished old man of seventy-two years, who was admitted to my wards in the Philadelphia Hospital with pneumonia, of which he died. There was no suspicion whatever that the pericardium was involved. As already mentioned there was found an adherent, greatly thickened, tuberculous pericardium; calcification of the bronchial glands, but no tubercles in other parts of the body.

In Cases VI., XII., XIII., and XIV. the disease was also latent, and there was no suspicion of pericarditis during life.

Second group: With symptoms of cardiac insufficiency following the dilatation and hypertrophy consequent upon chronic adhesive pericarditis. The clinical features are really those of cardiac dropsy.

CASE XIV.—W. H. T., aged fifty-two years, admitted to ward F of the Johns Hopkins Hospital, June 27th, 1889, complaining of shortness of breath, swelling of the legs, and incontinence of urine.

Family history good. Father died of acute pleurisy, mother of old age, two brothers died when young.

The patient has had scarlet fever, measles, and malaria; denies syphilis. Has had rheumatic pains, but has never been in bed with acute rheumatism. Has used tobacco freely, alcohol in moderation. He was well and strong until two years ago, when he had a "bilious attack," and was in bed three weeks. He was well last winter until February, when he began to be short of breath and had a cough, which has lasted until the present time. About four weeks ago the shortness of breath increased, and his feet became swollen.

Present condition: An emaciated man, with dry, harsh skin; legs and scrotum œdematous; abdomen not swollen. Pulse, 104, tension increased; temperature, 102°.

Heart: Apex beat faintly visible in the fourth interspace; palpable in the nipple line; feeble. Cardiac dulness begins as high as second left interspace, near sternum. To the right it extends 2.5 cm. beyond the sternum; there is no thrill. The sounds are feeble; the second louder, more marked than the first. At the apex the diastolic pause is shortened—the sounds succeed each other at equal intervals of time; the second, at the left margin of sternum, is reduplicated.

Careful examinations of the heart on the 1st and 2d of July showed as a special feature the flatness extending into the second left interspace; the impulse was extremely feeble; the sounds were clear, and in the third and fourth interspaces quite loud; the second was accentuated. At the aortic cartilage the second was feeble.

Lungs: Clear anteriorly; resonance defective at right base. There were numerous râles at base and cracking râles over the left mammary region.

Abdomen: Soft; liver and spleen normal.

Urine clear; no albumin, no casts; sp. gr., 1010.

The case was regarded as one of cardiac hypertrophy and dilatation without valve disease. He was given tincture of digitalis every four hours, and saline purges.

He failed rapidly; the heart became very feeble; Cheyne-Stokes breathing developed, and he died on the morning of the 5th.

On admission the temperature was 102°, but after this did not rise above 99°, except on the evening of the 30th.

Abstract of autopsy (by Dr. Welch). Peritoneum smooth. In the thorax there were extensive adhesions on both sides. The pericardial sac was obliterated. The heart occupied an unusually large area. The surface was everywhere covered by a yellowish-white opaque layer, consisting of firm connective tissue and caseous matter, containing, especially on the surface, numerous gray and cheesy miliary tubercles. These exudations averaged 1 cm. in thickness over the whole surface, the thickest being over the outer surface of the ventricle. The heart, including the thickened pericardium and the base of the aorta, weighed thirty-six ounces. The myocardium was pale yellowish-brown, soft, with mottled fatty degenerations beneath the endocardium. In the apex of the left ventricle there were a few parietal thrombi. The thickness of the wall of the left ventricle was 18 mm.; of the wall of the right, 6 mm. The cavities were dilated; the aortic valves slightly thickened, but competent. The mitral orifice admitted three fingers. The valve segments were a little thickened. There were small gray tubercles on the endocardium of the right auricle about the orifice of the superior cava.

The lungs were œdematous and deeply pigmented; they contained many gray, fibroid, not cheesy tubercles.

There were abundant miliary tubercles on the omentum. The spleen contained a few miliary tubercles. The kidneys presented a number of opaque caseous masses, many in streaks. The liver also presented a few tubercles. In the intestines there were a few scattered miliary tubercles in mucous and submucous layers, but no ulcers. There were no tubercles in the brain.

In the chronic adhesive form of tuberculous, as of simple, pericarditis, the clinical features may be those of cardiac dropsy, and a diagnosis is made either of simple hypertrophy and dilatation of the heart when, as in the case just given, there are no special auscultatory signs, or of mitral insufficiency when there is at the apex a loud blowing murmur. The diagnosis of adherent pericardium, always uncertain, is doubly so in cases admitted with dyspnœa, dropsy, and the signs of cardiac dilatation, since under these circumstances it is almost impossible to make a satisfactory physical examination.

Third group: Acute tuberculosis. The clinical picture may be that of an acute tuberculosis, either general or with cerebro-spinal manifestations. The following is a good illustration of an acute miliary tuberculosis, the primary disease being in all probability in the mediastinal glands and pericardium:

Case XIII.—Moses B., aged twenty-four years, admitted to ward F of Johns Hopkins Hospital, January 25, 1890, complaining of cough and loss of strength. Owing to mental dulness and apathy it was difficult

to get any satisfactory information from the patient as to his family or personal history. He states that his present illness began only three weeks ago, though he has had a slight cough all winter. Since the onset of the illness he has been in bed and has had fever, cough, and night-sweats. There has been loss of appetite and great weakness.

Present condition: Temperature, 100.8°. Patient looks very heavy and dull; there are sordes on the lips, and the tongue is covered with a brownish fur. The skin shows traces of a squamous syphilide and there are well-marked nodes on the shins. The respirations are 37. The expectoration is muco-purulent and is at times blood-tinged. The physical examination of the lungs gives clear percussion resonance, the note perhaps a little higher in pitch at both bases behind. Anteriorly there are numerous piping and moist râles on the left side below the third rib; behind, the râles are universal.

Heart: Apex beat in fifth interspace below the nipple. The area of dulness does not appear to be increased. The first sound is very feeble and muffled at the apex, and possibly accompanied with a soft murmur. The second sound is well heard at the base, and both sounds are unusually loud to the right of the sternum in the sixth intercostal space. The examination of the abdomen is negative.

During the three days the patient was in the hospital there was irregular fever (from 101° to 103°), increasing debility, with hurried respirations, tremor of the extremities, and gradual failure of the heart. The bubbling râles were so numerous with inspiration and expiration, that it was impossible to hear the heart sounds. The examination of the sputum was negative. The urine was dark-yellow in color, acid, trace of albumin, and there were several casts seen. The diagnosis of acute tuberculosis was made.

Autopsy (by Dr. Welch). Abstract: Body of a large, strongly built, well-nourished, muscular man; macular eruption present on the skin; large node on the left tibia.

No special changes in the brain.

The deep cervical glands slightly enlarged, containing numerous small tubercles and caseous areas. Extensive pleural adhesions on both sides. Both layers of the pericardium were adherent over the entire heart, greatly thickened, and contained in the membranes numerous miliary tubercles. The anterior mediastinal lymph glands were enlarged and presented numerous miliary tubercles and caseous masses. The heart was enlarged and dilated. The length of the left ventricle from apex to edge of aortic valve, 13 cm.; thickness of wall of the left ventricle, 16 mm.; the columnæ carneæ in the left ventricle were extremely prominent.

The lungs were congested throughout, œdematous, and contained scattered tubercles surrounded by areas of pneumonia. No caseation except in the tubercles themselves. The mesenteric glands were enlarged and those near the spleen were caseous. The kidneys showed much fatty degeneration in the convoluted tubules.

In the following case the tuberculosis was chiefly manifested in the cerebro-spinal meninges, and the clinical picture was that of ordinary tuberculous meningitis:

Case XIV.—John T., aged sixteen years, admitted to ward F of Johns Hopkins Hospital, November 5, 1889, complaining of pain in back and head. Patient is well-nourished, not emaciated.

His mother is dead; father, five brothers, and six sisters living and well; does not know of what his mother died; says he has been ill for three weeks with headaches, tired feelings, pains over the body. He has been obstinately constipated for ten days; has been in bed for two weeks; says he had a chill a week ago. When admitted he looked very ill; temperature, 95°. After having been in bed for two hours with hot bottles to his feet, temperature rose to 98°. He passed a quiet night; temperature rose to 101° at 8 P.M.; pulse, 72.

On the 6th, the examination revealed the following: Tongue heavily coated, white. Patient is rational, answers questions well, but shows a great dislike to be moved in bed; lies on the left side with the head a little drawn back, and when an attempt is made to move him he resists, saying that it is painful. There is no paralysis; pupils are of medium size and active. Abdomen not swollen, not tender. Spleen not enlarged. Heart sounds are clear at apex and at base. Examination of lungs negative.

On the 7th and 8th he was much worse; became apathetic; rambled; the temperature ranged from 97° to 102°. Heart was examined again on the 8th, and the note reads: "Sounds at apex and base are quite clear."

On the 9th and 10th the meningeal symptoms were more pronounced; he became unconscious and the discharges were passed involuntarily. At times the arms and legs seemed a little stiff, resisting flexion. Pupils moderately dilated; convergent squint in left eye; the retinal veins slightly distended and engorged; no swelling of the disks, but the physiological cupping was absent.

On the 11th there was a good deal of rigidity of the arms and of neck. Abdomen retracted. Death took place on the morning of the 12th.

The case was regarded as one of meningitis, probably tuberculous. There were no features calling special attention to the heart.

Autopsy (by Dr. Welch). Abstract: In thorax, glands at root of neck and in mediastinum enlarged and caseous. A very large caseous gland lay just beneath the ensiform cartilage. One was closely adherent to the pericardium. Some of these glands were full of miliary tubercles. The external surface of the pericardium was thickly studded with small tubercles. The two layers of pericardium were adherent, and between them was a mass of partly caseous, partly gelatinous-looking tissue from two to fourteen millimetres in thickness. Over the left ventricle was a small cavity filled with cheesy pus. The heart weighed 542 grammes. The muscle substance was firm. Wall of left ventricle, 14 mm.; of right, 3 mm. Valves were normal.

The lungs presented numerous irregular areas of hemorrhage, chiefly beneath the pleura. There were no tubercles. On the pleural surface of the diaphragm, extending from the pericardium on the right side, there were a few miliary tubercles. No special changes in liver, spleen, and kidneys. The brain and spinal cord presented a typical picture of tuberculous meningitis.

Fourth group: Cases with symptoms of acute pericarditis. This group, the most important in many respects, includes cases in which the pericarditis is acute and accompanied with more or less exudation of a sero-fibrinous, hemorrhagic, or purulent character. Here,

too, the process may be latent, as in Case VII., a young man aged twenty-eight years, who died under my care, of hæmoptysis. There was chronic tuberculosis of both lungs with extensive pleural adhesions. "The layers of the pericardium were united by soft adhesions, which could be readily torn through. On each membrane were innumerable small granulations, and here and there a nodular tubercle from one to two millimetres in diameter." This case is of special interest, as it shows the first stages of the process which ultimately causes enormous thickening of the pericardial membranes with universal adhesions. The tubercles, when small, may be readily overlooked. Acute plastic pericarditis in chronic tuberculosis is not, however, always due to the eruption of miliary tubercles. In two recent autopsies on patients with chronic pulmonary tuberculosis dying in my wards there was simple pericarditis without a trace of tubercles, and with little or no exudation. The following case, which was admitted to ward E under the care of Dr. Thayer in my absence, illustrates the mode of onset and the clinical features of a tuberculous pericarditis which came on in a strong, well-developed, muscular man, and proved fatal within three weeks:

CASE XV.—John P., aged thirty-eight years, admitted August 18th, with swelling of the legs and dyspnœa. The family history is good. He has been, as a rule, healthy, though in his childhood and youth he had many of the infectious diseases. He has been a moderate drinker. He denies syphilis. The present illness began about two weeks ago with pain in the left shoulder and about the heart. Feet began to swell ten days ago, and he has had cough and shortness of breath for about the same length of time. He has had no nausea; his appetite has been fairly good. Within the past few days he has become much worse.

On admission the patient had intense orthopnœa; pulse 130, but moderately full. He had a distressing cough, with clear watery expectoration. There was great œdema of the lower extremities and of the scrotum. The finger-tips and mucous membranes were bluish in color. In the examination of the heart at the time no murmur could be detected, but the second sound was accentuated at the pulmonary cartilage.

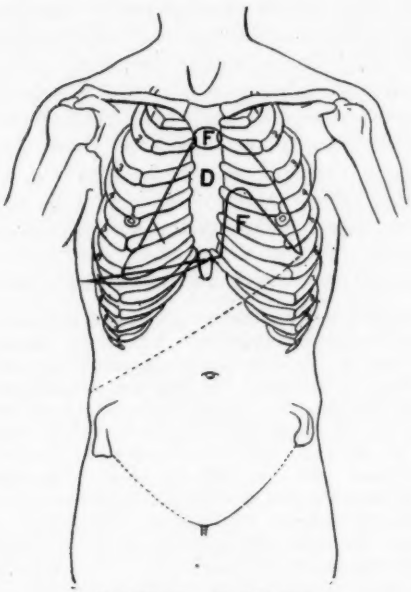
On the following morning the patient was quiet; respirations 28 to the minute; pulse 84, the beats irregular both in rhythm and force, the volume fair, and tension not diminished.

Thorax apparently symmetrical, but the manubrium very prominent, expansion equal. In front, resonance on both sides good, though on the left side flatness begins at the fifth rib midway between the nipple and axillary line, and the dulness seems here to be somewhat movable. There are numerous sibilant and sonorous râles to be heard in front. Passing down the left side and into the axilla, the breath-sounds become more feeble and fine moist râles are heard. Pitch of resonance at the extreme left base is higher than at the right, and the vocal resonance is somewhat diminished.

On auscultation there are numerous coarse and medium fine râles to be heard at both bases. At the extreme left base the respiratory murmur is almost absent.

Heart: Point of maximum impulse difficult to localize; slight general heaving over the whole præcordial area; relative dulness begins above at second rib and extends well to the right of the sternum. The prominence above noted is just at the junction of the manubrium and gladiolus, and just at this point there is dulness over a very limited area. Relative dulness extends outward to a point nearly 5 cm. outside

CHART I.



D. Dull area. F. Flat area.

the nipple. (Chart I.) The heart-sounds are heard with the greatest intensity at the fifth space a little inside of the nipple line. There the first sound is full and booming; the second not so loud. Passing inward toward the sternum the sounds become associated with a superficial, soft, squeaking sound, diastolic in time, heard loudest over the mid sternum, and pericardial in character. This is heard faintly all over the base. The murmur is more distinct in forced expiration than during inspiration. The second pulmonic is a trifle louder than the second aortic sound. The radial pulses are equal in volume, and there is no pulsation in the upper sternal notch; there is no tracheal tugging. The examination of the abdominal organs is negative. The urine is yellow-colored, acid, sp. gr. 1024, distinct trace of albumin; several hyaline casts were found. Throughout the 20th and 21st the patient remained in much the same condition. On the 22d there was a slight rise in temperature to 100.5°; the pulse varied greatly in rate and character; at noon was slow, regular, and full, from 70 to 90 per minute,

and again was as rapid as 140. The patient, in many respects, was better. The œdema of the legs had disappeared. The urine had increased in quantity. On the 19th only 180 c.c., and on the 20th 350 c.c. had been passed. On the 21st and 22d the amounts were 700 and 1100 c.c.

23*d*. The temperature has been between 97° and 98°; at the morning visit the pulse was 148, regular in force and rhythm; the respirations 32. The patient was lying quietly on left side. The physical signs practically those noted above with the exception that there is an extension of the œdema at the bases of the lung. The patient died suddenly at 4.30 P.M. to-day.

Autopsy (by Dr. Flexner). Large, muscular man; moderate œdema of the legs and of the subcutaneous tissue of trunk. Fat well retained, both beneath skin and in omentum and mesentery.

Pericardium is adherent to the left pleura; the sac thickened and contains a considerable amount of clear serum. Both layers are covered with a thick fibrous deposit, looking like a hairy coat. The thickness of the pericardium over the heart is 3 mm. When incised the thickened layer is grayish in color, with many opaque or yellowish points scattered here and there, often continuous, and having the well-recognized characteristics of tubercles of this membrane. The heart was greatly enlarged. The valves were normal. The thickness of the left ventricle was 17 mm.; length of ventricle, 8½ cm.; mitral orifice, 10½ cm. in circumference. Thickness of right ventricle, 6 mm.; tricuspid orifice, 12 cm. in circumference. The walls of the auricular appendix are almost completely converted into a grayish-white material with only a thin internal film which appears like muscle. In the endocardium of the left ventricle are numerous ecchymoses. There are also a few small ones on the right ventricle and in the auricles, and on the endocardium of the auricles are a few small, round, whitish miliary tubercles.

The left pleura is much thickened; parietal and costal layers adherent in places, but where not in actual contact there is clear serum between them. The costal pleura strips up with difficulty, and is very hard and cuts like cartilage. The diaphragmatic pleura is especially thickened, and on section it is seen to be composed of a dense, almost cartilaginous, grayish tissue, containing yellow, opaque, caseous masses. The apex of the left lung is retracted, hard to the touch, and on section contains a dense, deeply pigmented connective tissue, and old areas of caseation; no calcification. There are a few small foci of miliary tubercles, and scattered fibrous tubercles elsewhere in the lung.

The right lung is voluminous, and in the greater part of its extent free from adhesions, but the pleural surfaces present numerous grayish-white elevated masses, single and conglomerate, which can be scraped off with difficulty. The costal pleura presents similar tubercles. About these there are, here and there, fresh fibrin. In the apex the upper lobe presents a few foci of fibrous miliary tubercles.

The spleen contains a few scattered tubercles. Nothing of note in the abdominal viscera; the intestines did not present tubercles.

Here there was no suspicion before death that the process was tuberculous, nor in reality was there any clew to indicate that this was the possible nature of the trouble.

The following instance is the only one which has come under my

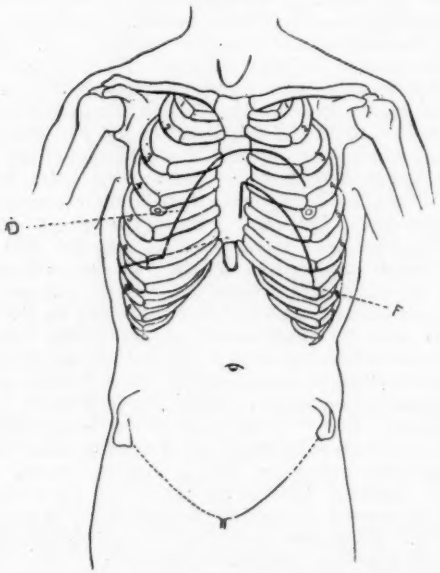
notice, in which the diagnosis of tuberculous pericarditis was made with reasonable degree of probability.

CASE XVI.—E. B., aged thirty-nine years, washerwoman, colored; admitted to ward G of the Johns Hopkins Hospital, July 18, 1892, complaining of pain and swelling in the abdomen, swelling of the feet, and cough.

So far as could be gathered the family history is good. She has two brothers and four sisters living and well.

The patient is a married woman, has had two children, one miscarriage. Has had uterine trouble at times, but has been quite regular until

CHART II.



D. Dull area. F. Flat area.

two months ago. Since childhood, during which she had the ordinary infectious diseases, she has enjoyed very good health.

Her present illness began early in May, when she had shortness of breath, nausea, loss of appetite, and pain in the abdomen. The symptoms which she narrated are indefinite, and she speaks of headache and attacks of diarrhœa. The main points are that she has, during the past three months, been in bad health, has lost in weight, has had difficulty in digestion, and shortness of breath. About a month before admission she noticed some swelling in the abdomen, and about the same time the face became puffy. The feet began to swell four days ago. She has sometimes had attacks of coughing at night, but no expectoration. On

admission, the note made by Dr. Thayer was as follows: Rather sparely nourished woman; dorsal decubitus; lips and mucous membranes somewhat pale; tongue slightly coated; respirations 30 per minute; pulse 104, regular in force and rhythm, tension not increased; temperature on admission 98.2°.

Expansion equal on both sides of the thorax. Percussion everywhere clear. On auscultation the only abnormal signs are fine moist râles during inspiration at both apices.

Heart: There is slight heaving in the cardiac area; the point of maximum impulse is hard to determine. The area of cardiac dulness, as indicated on Chart II., begins about the second rib and extends far to the right of the sternum. Flatness begins at the third. The general outline of the area as indicated is triangular, and it extends to the left, far down into the seventh interspace. This flatness in the cardiac region is distinctly movable.

On auscultation the sounds are feeble at the apex, become louder in the fourth and fifth interspaces, and are still more distinct at the base, where the second aortic sound is accentuated.

Abdomen: The abdomen is full, generally tympanitic, and the walls are a little tense. The liver flatness begins at the seventh rib in the nipple line, and extends five fingers' breadth below the costal margin. The edge is not distinctly palpable.

The spleen is not palpable.

There is now no swelling of the legs, but she states that they were swollen four days ago.

The urine was cloudy, acid, sp. gr. 1012; slight trace of albumin, no sugar, numerous leukocytes.

During the first ten days in hospital the patient improved. The temperature chart shows a great irregularity. The morning register was at 98° or 98.5°, and in the afternoon, between four and six o'clock, rising to 101°, sometimes to 103°. An ice-bag was placed over the heart and she was given stimulants. For the second ten days, from July 29th to August 8th, there was distinct improvement; the temperature was lower and only once reached 102°. On August 1st it was noted that the area of dulness was diminished, and there was a friction rub heard in the mid-sternal line—synchronous, however, with the respiratory, not with the cardiac movements. On the 3d it was noted that there was a well-marked rubbing friction heard in the second and third left interspaces, and heard as far out as the nipple line and over the sternum adjacent to these spaces. This was the first time since her admission that there was a well-marked friction sound. The pulse has been very variable, ranging from 98 to 112. The patient is brighter and seems to be improving.

Between August 8th and 20th the irregular fever persisted, and on several occasions rose in the afternoon to 103°. She complained at times of pain in the præcordial region and of general abdominal pain. The pulse has ranged from 109 to 125. The note on the 17th was as follows: "There is moderate heaving over the lower sternum and the epigastrium; the point of maximum impulse is rather difficult to determine. Relative dulness begins at the second rib and extends well to the right of the sternum. The absolute flatness, however, scarcely exceeds the normal limit. The heart-sounds heard at the outer limit of the dulness are very feeble, and the first is followed by a short systolic puff. Passing inward the murmur becomes louder, and it disappears above the fourth rib. In

the lower sternum there is a well-marked double friction murmur, soft, close to the ear, and resembling in this respect a pericardial murmur. The murmurs are more intense on forced inspiration."

From September 1st I saw the case daily.

September 11th. Note to-day was as follows: "The intermittent type of fever has persisted, temperature in the evening rising to 102.5°, and occasionally, as on September 6th, to above 103.5°. The pulse has been more rapid, frequently over 120. There has been a good deal of tenderness over the fourth and fifth costal cartilages on the right side.

"On percussion the flatness does not begin until the fourth rib, but extends beyond the right border of the sternum. The sounds at the apex are feeble, and there is heard here a slight pericardial friction murmur which becomes more distinct toward the ensiform cartilage. No endocardial murmur is heard. Of late the cough of which the patient complained on admission has become much more troublesome, but there is no expectoration. The percussion note at the left base is somewhat higher than at the right, and the breathing is feebler, and toward the axilla somewhat tubular in character. There are numerous râles at both bases. The abdomen is a little full and she complains of pain in it."

On the 13th a small quantity of muco-purulent sputum was obtained which did not contain tubercle bacilli. During all this time, although the fever has persisted, she has, curiously enough, steadily gained in weight; thus on August 8th she weighed 104 pounds; on the 16th the same; on the 29th, 109 pounds; September 5th, 110; and September 13th, 114 pounds.

September 22d. The abdomen has become more swollen. On examination there was distinctly movable dulness, though fluctuation could not be readily obtained. There was tenderness in the region of the liver, but no nodular masses could be felt. The friction murmur up and down the sternum was more marked, and there was also heard on inspiration a creaking, leathery, friction sound. The physical signs in the lungs show increase in the râles which are heard over the whole of the right back. The tactile fremitus is a little increased, and resonance is defective at the right base. There is no pleural friction.

On the 25th it was noted particularly that the pitch of the percussion toward the outer side between the scapula and the axilla was higher, but without any trace of tympanitic quality. The pericardial murmurs are loud. During the past week the patient has been worse. There is more pain in the epigastric region, the cough is very worrying at night, and there is increasing œdema about the legs and the skin of the back.

At her own desire the patient was taken to her home on September 27th.

Up to September 1st the patient had been under the care of my first assistant, Dr. Thayer, and the case was regarded as one of pericarditis with effusion, and when he left for his vacation she seemed to be improving. During the time she was under my care I made her the subject of several very careful examinations, and repeatedly demonstrated the condition to the class of graduate students, and discussed frequently the probable nature of the trouble. The persistence of the fever and the marked involvement of the lungs suggested to my mind the possibility of the existence of tuberculosis. We could not, however, for some time obtain any sputa for examination, but after September

1st, on several occasions she brought up a muco-purulent, and once an almost purulent expectoration, which was very thoroughly examined with negative results. Notwithstanding, it seemed to me that the case was unlike any ordinary rheumatic or septic pericarditis, and I felt justified in dictating, the last morning I saw her, "that the protracted course of the illness, the signs of pulmonary trouble, and swelling of the abdomen, make it probable that the patient has tuberculosis." Three days after her return home she died, and we were fortunate enough to secure an examination, which was kindly made by Dr. Flexner. The following is an abstract of his report:

Autopsy. There was a considerable quantity of clear serum in the peritoneum, both layers of which were smooth. There were no pleural adhesions, no tubercles on either layer. The pericardial space uncovered by lung unusually large, measuring 15 by 20 cm. The parietal pericardium is everywhere free. The outer surface shows numerous white elevations, many of which are confluent and more massed in some places than in others. On incision the layer is greatly thickened, in places as much as 6 mm. About 300 c.c. of turbid serum escaped. The visceral layer was everywhere covered with flaky, yellowish-white fibrin. On section this layer is greatly thickened and contains numerous yellowish, caseous masses; thus the thickness of the wall of the left ventricle is 3 cm., nearly one-half of which is the thickened pericardium. At the root of the aorta are masses of caseous glands, adherent to the pericardium. The weight of the heart with the thickened sac was 1110 grammes. The chambers were dilated. There was no valvular disease.

The lungs were voluminous, contained many scattered and conglomerate tubercles, many of which were just beneath the pleura. There was diffuse bronchitis, but there were no cavities. The bronchial glands were caseous. Liver, spleen, and kidney contained tubercles; those in the spleen were large and caseous. There were a few small tuberculous ulcers in the small intestines. The mesenteric glands and the glands about the pancreas were caseous.

Diagnosis.—The diagnosis of tuberculous pericarditis is extremely uncertain. In the large group of cases in which the membranes are thickened and united, the difficulties are those which pertain to the recognition of adherent pericardium, difficulties which are enormously enhanced by the state of cardiac insufficiency with which these cases usually come under observation for the first time. In children with a history of repeated attacks of rheumatism, the bulging præcordium, systolic retraction at the apex, the fixation of the upper limit of cardiac dulness, and the diastolic rebound, speak for adherent pericardium; and if in a case of this sort there has been no history of rheumatism, and if, on the other hand, there are indications elsewhere of tuberculosis, a probable diagnosis may be made. In the cases which set in as acute pericarditis, unless there are evidences of tuberculosis in other parts, as, for instance, in the left pleura or in the peritoneum, or there are signs of local disease in the lung and tubercle bacilli have been found in the expectoration, the diagnosis can rarely be made. The effusion may be

equally as great in tuberculous as in rheumatic pericarditis. If paracentesis be performed, the presence of a bloody exudate is decidedly in favor of tuberculosis; once, at least, tubercle bacilli have been found (Kast). The clinical features themselves offer no criteria, though it would seem probable that in the acute cases with sero-fibrinous exudation the course is more protracted and the fever more irregular than in the ordinary forms of pericarditis; and in such a case, as in XVI. in my series, the development of diffuse signs in the lungs may lead to a strong suspicion that the process is tuberculous.

TREATMENT.—It is not improbable that tuberculosis of the pericardium may, as a similar process in the peritoneum, recover completely. Possibly some of the cases of simple adherent pericardium are instances of healed tuberculosis. The chronic adhesive form persists in all likelihood for years, producing few if any symptoms until the compensation fails in the hypertrophied and dilated heart.

It is highly probable that a majority of cases which terminate in general synechia of the membranes present no clinical features; the process is slow, insidious, essentially chronic, and not associated with definite symptoms. A case which has set in acutely must be dealt with as any other form of pericarditis, the indications being, first, to limit, if possible, the intensity of the inflammation; and, secondly, to prevent the evil consequences of the presence of a large amount of fluid in the sac. We have no medicinal agents at our command which have any positive influence in controlling the ordinary inflammation of serous membranes. In *Guy's Hospital Reports* of a year or two ago, *apropos* of the treatment of pericarditis, there is a story told of Sir William Gull which is worth quoting in this connection. "He once met a practitioner on a case of rheumatism, in which he detected a pericardial rub. He said nothing of this to the patient's friends, but approved the general treatment, and they came away together. 'Oh, Dr. Gull, it was very good of you not to let them see I had made that dreadful oversight. I cannot think how I can possibly have failed to detect the pericarditis.' 'Never mind,' said Gull, 'it is just as well; for if you had detected it, perhaps you might have treated it.'" There is one measure in the utility of which we may have great confidence, namely, the ice-bag applied continuously over the præcordium. It allays the pain when present, and appears to check the tendency to effusion, while under its use an exudate may be absorbed with rapidity. It is very much to be preferred to blisters or the thermo-cautery. In some instances the patients complain very much of the intensity of the cold of the ice-bag, and in such I was in the habit, in Philadelphia, of using Leiter's coil, through which the water flowed continuously, and it could be arranged to have any temperature thought necessary.

A second indication holds good in tuberculous as in other forms of

pericarditis—when the effusion reaches a certain grade, and the pulse is irregular and feeble, the color becoming bad, the respirations hurried, paracentesis should be performed, or, if necessary, the sac freely incised and drained.

THE TAMPON IN MENORRHAGIA.

By William T. Lusk, M D.,
of New York.

Is the tampon a childish expedient in recurrent profuse hemorrhages at the menstrual epoch? In certain cases its use has been recommended by Gehrung, by Mays, and by Reeves Jackson. Still, with the profession at large, respect for menstruation as a physiological function has a dominant influence in determining treatment.

I am prepared to admit in advance that, as a rule, menorrhagia is the result of pathological conditions, viz., of inflammatory thickening of the endometrium, with increased vascularity and polypoid growths, and of enlargement of the uterine cavity, with consequent increase of the bleeding surface. The changes in the endometrium may be due to a primary inflammation, or, may be secondary to displacements, to neoplasms, to obstructions of the cervical canal, to connective-tissue changes in the uterine walls, to imperfect involution, and to retention of portions of the ovum following abortions or childbirth. In all these, and in similar instances, a rational therapeusis should unquestionably be directed to the source and origin of the evil.

But there still remain cases in which no definable cause is recognizable. The curette, uterine drainage, and internal remedies fail to afford relief. The recovery of the patient between the menstrual periods becomes more and more incomplete, and the conditions resulting from profound anæmia lead to hopeless invalidism. In such cases the question is often broached as to whether the ovaries had not best be removed. "Normal ovariotomy" is practically devoid of danger. If the removal of the tubes and ovaries is complete the hemorrhage will cease. The relief of suffering following the removal of incurable pus tubes is one of the most brilliant achievements of modern gynecology, and is cheaply purchased by the sacrifice of the ovaries. But in the class of cases under consideration, especially if the patient be young, the loss of the ovaries has not seemed to me to be a matter of indifference. The medical men to whose care these patients ultimately fall will bear me witness that many of them subsequently display symptoms of mental and moral perversity, and that all dislike the thought that they are "different from other women."

For this reason I have been led, when other lines of treatment have proved ineffective, to resort in anæmic patients to the tampon as a means of restraint or repression at the menstrual period. By this plan opportunity is afforded for the continuous repair of the blood, and for the restoration of disordered function. At first it was with a feeling of timidity that I ventured to employ the tampon upon the first evidences of menstruation, but experience speedily showed that the practically complete repression of the menstrual flow is absolutely harmless.

However elementary it may seem, it may be well to state that the method of tamponing is not a matter of indifference. At least, personally, I have only got satisfactory results when following the procedure of the late Dr. Marion Sims. He advised, as material for a tampon, wads of cotton of suitable size soaked in carbolized water and compressed into the form of flattened disks. These, by means of a Sims speculum, should be applied firmly to the vault of the vagina. It is important that they should be placed with the flattened surface in a transverse direction, rather than in one parallel to the vagina, and that the packing should be arrested at the urethro-vaginal septum. At the end of twenty-four hours the tampon should be removed, the vagina should be irrigated, and a fresh tampon should be introduced. When thus employed for forty-eight hours, the flow is usually ended. In rarer cases a third application of the tampon may be called for.

It is interesting to watch, as the result of this plan, the restoration of the patient to health. In time, likewise, the normal tonus of muscular structure of the uterus is restored, and the further use of the tampon ceases to be necessary.

As an illustration of the beneficial workings of the tampon, I select the following instance:

Mrs. F., aged thirty-six years. In girlhood had obstructive dysmenorrhœa, associated with retroflexion and stenosis of the cervical canal, for which she received treatment from the late Dr. Elwood Wilson. At nineteen she married; she had two miscarriages in the first year of her married life; afterward she gave birth to three children at term. During gestation she always experienced a peculiar exhilaration and sense of *bien aise*. With the weaning of her children, which was usually delayed until the second year, the menstrual flow returned, and was characterized by great profuseness. For this the usual remedies, internal and local, were employed, including ergot, viburnum, hydrastis, tannin, cannabis Indica, curetting, and applications of iodine to the mucous membrane. All were of no avail. There were no fungous growths obtained by the repeated scrapings. After the birth of the third child I repaired a laceration of the cervix of moderate extent.

The menstrual period lasted from five to six days. For ten days following the patient was compelled by dizziness to remain in bed or upon a couch in the recumbent posture. Gradually a neurasthenic condition developed, characterized by insomnia, multiform neuralgias,

palpitations of the heart, and hysterical twitchings. For two years, owing to flatulent dyspepsia, she lived exclusively on a meat diet. Finally she withdrew altogether from society and devoted her entire time to a contemplation of her symptoms. Her weight fell from 140 to 97 pounds.

From the time of the performance of Emmet's operation, in 1889, she lost faith in medical aid, and was guided in her treatment, for the most part, by the volunteer counsel of non-professional friends. Her husband discussed her case with an eminent gynecologist, who advised removal of the ovaries, but the proposition was promptly and indignantly rejected by the patient, whose maternal instincts were strong.

In January last, when I called to visit one of the children, I was shown by her husband the contents of a chamber, which contained fully a pint of pure blood. Similar losses, he assured me, were the rule at her menstrual periods. I at once introduced a tampon and checked the bleeding. The tampon was renewed upon the two succeeding days, when the flow ended.

Acting upon the theory that the primary cause of the trouble had been protracted lactation, and that its persistence was due, not to any organic disease, but to the relaxed condition of the uterine muscular fibre, I administered iron and food, the latter at first in small quantities at short intervals, and, afterward, as her digestion improved, I persuaded her, though with many misgivings on her part, to adopt a mixed diet. Since January, with the return of each period, I have employed the tampon for two days. The patient has gained twenty-two pounds. Sleep, appetite, strength, and color have returned. All her morbid fancies have disappeared. She is one of the happiest women in my *clientèle*, and never ceases to rejoice that she still possesses her ovaries, and that she has not been robbed of the hope of some day again becoming a mother.

METHODS AND RESULTS IN CASES OF TUBERCULAR DISEASE, ANEURISM, UNUNITED FRACTURES, AND HEAD INJURIES.

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AND

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The following cases have occurred in the recent service of Dr. J. William White, in the Hospital of the University of Pennsylvania, and have been selected chiefly from that of the eighteen months ending June, 1892. A few cases dating further back have been included, and two or three quite recent cases of special interest have been added. The list includes a large number of private patients operated upon at the hospital, as well as the ordinary ward cases.

It is worthy of note that in some thousands of etherizations not once were symptoms noted which occasioned serious alarm, while in not over two dozen chloroformizations one child narrowly escaped death from the anæsthetic.

The details of modern antiseptic practice have invariably been rigidly adhered to. The usual preparation of the field of operation is carefully carried out. The part is first shaved, then thoroughly scrubbed with soap and hot water, then washed with alcohol, and finally with bichloride solution 1 : 1000. If the patient is admitted to the hospital in time, and this is always desirable, this cleansing is carried out the day before operation, after which the part is kept wrapped in towels wrung out of sublimate solution 1 : 3000. The bowels are well cleared out by a laxative given in the evening, aided if necessary by an enema given the following morning. After a light breakfast no further nourishment is administered till after the operation. After anæsthetization, and immediately before the first incision, the part is again thoroughly cleansed with alcohol and sublimate solution 1 : 1000.

All instruments are boiled for twenty minutes in water containing one per cent. of sodium bicarbonate. This makes the boiling-point of water slightly above 212° F., and prevents the rusting of the instruments. From this solution instruments are transferred to trays containing hot boiled water. Sponges are wrung out of 1 : 4000 bichloride solution. Vessels are tied with sterilized silk or catgut. Silkworm-gut is preferred for suturing. Clean, incised wounds in healthy tissues are closed. Where drainage is necessary, strands of sterilized silk or a fenestrated rubber tube is used. Lister's latest dressing, the double cyanide of zinc and mercury, and the bichloride dressing wrung out of a 1 : 3000 solution have been employed. Both present points of advantage, and either makes a satisfactory dressing.

The cases have been grouped from a clinical standpoint, and histories which would represent simply repetitions with minor points of difference have been omitted.

The clinical diagnosis of all neoplasms has been confirmed by microscopical examinations.

TUBERCULAR ADENITIS.

During the period embraced in this report, seventy-six operations have been performed for this affection. The tumors were found in the following regions: cervical region, 55; axilla, 7; inguinal region, 5; miscellaneous, 9. The majority of the patients were children or young adults. All recovered. The histories are so similar that a brief outline will suffice for the group. Usually there had been lesions of the area drained by the lymphatics communicating with the inflamed gland, thus opening the way to tubercular infection or rendering active

a latent tuberculosis. When the cervical glands were involved, inflammations or catarrh of the tonsils, fauces, or pharnyx, carious teeth, middle-ear disease, or eczema of the scalp, have been the lesions preceding the tubercular infection.

About two-thirds of the patients gave a tubercular family history.

Experience in this service has convinced us that, although a gland thus infected may remain quiescent for a long time, may undergo caseation or softening, or, if subsequently infected with pyogenic microörganisms, may suppurate, it rarely undergoes spontaneous resolution. Most of the patients had been treated locally and constitutionally for long periods before applying for relief by surgical measures, apparently without benefit in any individual case. The propriety of removing such diseased glands is undoubted. Objections have been made on the grounds that an operation may kindle a latent tubercular affection, or cause a local disease to be rapidly disseminated. With regard to the former, it must be remembered that latent tuberculosis of these glands frequently becomes active without discernible cause; the latter objection is largely theoretical; both lack the support of experience. Neither of these untoward results has occurred in this service. Moreover, operation insures a much less conspicuous scar than when the diseased glands are allowed to open spontaneously.

The method of operation depends upon the stage the disease has reached. If softening has not occurred, excision is preferred, and all enlarged glands are removed, the wound being closed as in any other non-infected wound. If softening or suppuration has taken place, erasion is selected; or if all diseased tissue cannot be removed in this way, combined excision and erasion are employed, all infiltrated or ulcerated skin being sacrificed. In those cases in which a clean excision has been impossible and primary union cannot be expected, the cavity is swabbed out with a solution of zinc chloride, 30 to 60 grains to the fluidounce of water, and the wound is packed with iodoform gauze. Even with the greatest care, minute infected glands may be left behind and recurrence sometimes follows. These are removed as soon as they are detected.

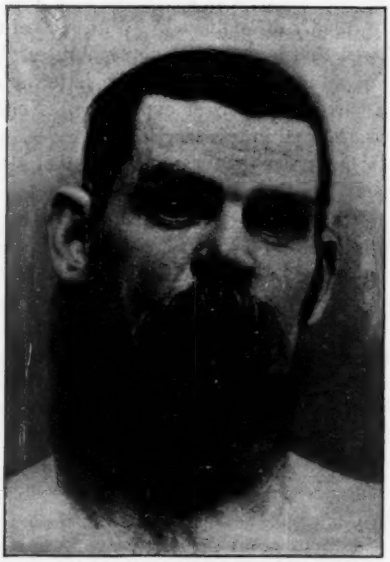
Some of the operations upon the neck have been extremely delicate and tedious, requiring prolonged and careful dissections. The sheath of the great vessels was usually exposed, and not infrequently the growth was intimately adherent to it. In two cases lateral ligatures were applied to the internal jugular vein to check bleeding occasioned by the tearing away of small veins at their point of entrance to the main trunk; the tumor has frequently been found in close relation to the transverse processes of the cervical vertebræ. In one case it was necessary to divide the omohyoid and sterno-mastoid muscles, the superior cervical plexus, the spinal accessory nerve, and the external jugular vein, in order to remove the entire mass. In some instances the chain

of glands was followed as far as the subclavian vessels. The patients all made satisfactory recoveries. When the wounds were closed, prompt union followed. The wounds in the cases which were treated by the open method, granulated rapidly and closed firmly.

One non-operative case may be mentioned, which, when measured by its results, is of considerable importance. This patient was treated by deep injections of a sterile 10 per cent. emulsion of iodoform in glycerin. The case is as follows:

T. S., male, aged forty-four years, married, butcher, applied for advice on account of a large, hard, firmly fixed growth on the right side of the neck, lying under the sterno-mastoid muscle, and apparently involving it and the anterior edge of the trapezius in the diseased process. The infiltration followed the course of the sterno-mastoid as far as the clavicle (Fig. 1). It was

FIG. 1.

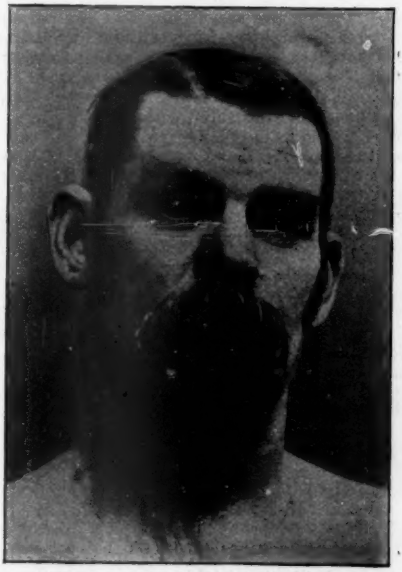


Tubercular adenitis with infiltration of surrounding tissues.

irregularly lobulated. A smaller lump was found just beneath the chin, and a similar but less marked infiltration existed on the opposite side of the neck. About the neck were scars marking the site of six previous operations for the removal of enlarged glands. The grandfather and an aunt of the patient (both on the mother's side) died from consumption. The seat and appearance of the growth, its chronic, sluggish course, the absence of inflammatory symptoms and pain, its solid character, and the frequent recurrences led to the diagnosis of tubercular adenitis. The small fluctuating tumor under the chin was excised. The large mass on the side of the neck, however, seemed so extensively diffused, had infiltrated and involved so many of the adjacent tissues, and would have required for its removal such an exten-

sive destruction of important structures, that it was decided to employ deep injections of iodoform. For this purpose a mixture was made of sterilized iodoform 1 part and boiled glycerin 9 parts. Ten minims of this were injected deeply into the tumor at different points, at intervals of ten days. To avoid throwing the mixture directly into the circulation the hypodermatic needle was first driven into the indurated mass; if no blood flowed through this the syringe was attached and the iodoform-glycerin was injected. Twelve injections were given. Each occasioned slight ephemeral pain, and local reaction lasting not over forty-eight hours. Under this treatment the swelling has almost entirely subsided, merely a general thickening remaining (Fig. 2). While the

FIG. 2.



Effect of treatment by iodoform injections.

patient was under observation, other glands became enlarged, but entirely disappeared after the use of the injections. The patient's general condition has greatly improved; he is cured of a cough from which he suffered for months, has gained in weight, and is again working at his trade.

Whether the favorable result in this case is due to the specific influence of iodoform on the tubercle bacillus, or is brought about by what Lannelongue terms sclerogenesis—*i. e.*, the conversion of the tuberculous infiltrate into fibrous tissue, which encapsulates and destroys or renders innocuous the bacillus—is still *sub judice*. The majority of surgeons believe that iodoform acts as a specific, though injections of irritating solutions, such as chloride of zinc, have given good results in certain forms of surgical tuberculosis.

TUBERCULAR ARTHRITIS.

Five cases of tubercular disease of the knee-joint have been subjected to operation, and one case has been treated with injections of iodoform and glycerin.

CASE I.—Lucy C., aged fourteen years; disease of one year's duration. The knee had the characteristic appearance of tuberbular arthritis of this joint. Arthrectomy was performed, all infected tissue being removed, including a point on the internal condyle having a suspicious appearance. The divided ligamentum patellæ was sutured and rubber drainage was introduced. The wound was dressed antiseptically and fixation was obtained by a Gooch's splint. Healing was satisfactory and the patient recovered with fibrous ankylosis in the straight position, without any shortening.

CASE II.—G. K., male, aged twenty-seven years; suffered from tubercular inflammation of the knee-joint. As the disease was apparently limited to the synovial membrane, the operation of arthrectomy was performed, as in the preceding case. The patient recovered with a useful limb.

CASE III.—W. C., aged twenty-six years; suffered from extensive tubercular disease of the knee-joint and contiguous structures. Excision was performed, but the tubercular involvement was too widespread to be entirely removed by the operation; sinuses remained which continued to discharge, and it became necessary to perform amputation at the lower third of the thigh. Prompt healing followed.

CASE IV.—H. R., male, aged eleven years; suffered from tubercular disease of the left knee-joint. Excision was performed. The wound was drained, sewed with silkworm-gut, and dressed antiseptically, after which a Gooch's splint was applied. The patient recovered with firm union.

CASE V.—Clara L., aged twenty-eight years, owing to a long-standing tubercular disease, had ankylosis of the knee-joint in the flexed position. Excision was performed, the limb was straightened and dressed. As in the last case, firm union took place, and a useful limb resulted.

CASE VI. *Tubercular arthritis of knee, treated with injections of iodoform and glycerin.*—J. M., aged twenty-nine years, had some trouble in the knee-joint when nine years of age. Four years ago the same joint again became affected and afterward was never free from pain, which was always increased by use. The part became swollen, and for six months before admission the trouble had steadily grown worse. There was, however, no displacement, the range of motion was good, and the case was thought to be a favorable one upon which to try the effect of injections of iodoform. The joint was opened by small lateral incisions, and about one-half an ounce of flaky serum was evacuated. The joint cavity was irrigated with 3 per cent. boric acid solution, a 10 per cent. emulsion of iodoform in glycerin was injected, and the wounds were closed by suture. The reaction was marked, the entire limb becoming œdematous. Lead-water and laudanum were applied and the foot elevated; by the sixth day the œdema had disappeared. These injections were repeated at intervals of four days for two weeks, a half-ounce of the iodoform mixture being used each time. They occasioned but little pain and were followed by slight inflammatory reaction. The patient left the hospital much improved, promising to report at a later period, but has failed to do so.

CASE VII. *Tubercular inflammation of the wrist-joint treated with injections of iodoform and glycerin.*—J. B., aged twenty-one years. Fifteen months before applying for treatment he received a blow on the right wrist. There was slight swelling at the time, which disappeared under treatment. The swelling about the joint invariably followed upon its excessive use. Fifteen weeks ago he was compelled to quit work on account of the increased swelling and pain. A fusiform, doughy swelling surrounded the joint from the lower fourth of the arm to the metacarpo phalangeal articulation. When this swelling was palpated, roughened and movable bones could plainly be felt.

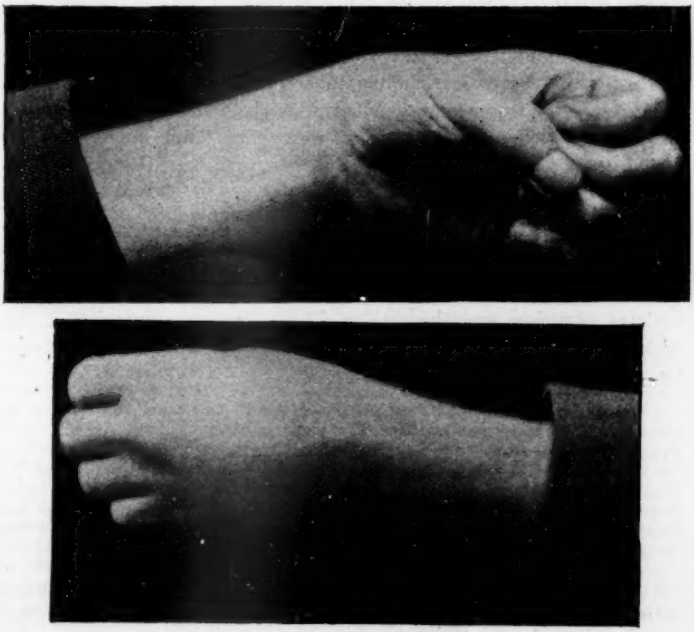
The hand was slightly flexed at the wrist, the fingers were extended, withered, and absolutely stiff. (Fig. 3.) The case seemed about as unfavorable as it well could be, but as amputation of the right hand in a young man is such a grave proceeding it was determined to make the apparently hopeless effort to save the part.

FIG. 3.

Tubercular arthritis of wrist-joint.

The ulnar aspect of the joint was accordingly punctured with a fine aspirating needle and two and a half ounces of typical tubercular pus were with-

FIGS. 4 AND 5.



Effect of treatment by iodoform injections.

drawn. A 10 per cent. emulsion of iodoform in glycerin (ʒij) was then injected into the abscess cavity. Considerable inflammatory reaction followed

the injection, but this gradually subsided. The injections were repeated at intervals of about a week for two and a half months, from one to three drachms of the emulsion being driven each time into all parts of the tubercular infiltrate. The abscess cavity became obliterated after the third injection; at about the same time pain disappeared, the swelling steadily subsided, the fingers became more movable, until in a few months the patient had a useful, painless hand, showing a scarcely perceptible enlargement about the wrist-joint. Under date of November 15, 1892, he writes that he can lift a pail of water with that hand and has no pain. The accompanying cuts, from photographs, represent the appearance of the part at this time. (Figs. 4 and 5.)

This result is particularly striking, since the wrist case was so advanced that no surgical operation other than amputation could even be considered. In the neck case (p. 42), treated by the same method, the infiltration was so extensive that thorough removal by the knife was out of the question. The knee case would ordinarily have been subjected to at least an arthrectomy. The treatment bade fair to render any operation needless, but, unfortunately, the patient has not recently been heard from. This treatment in joint cases is being tested by König, Bruns, Billroth, Krause, and the majority of the leading German surgeons. The curative effects appear to us to be due partly to the germicidal influence of the iodoform, partly to its stimulating action on the healthy tissues surrounding tubercular foci (see p. 44). In the above cases improvement was noted after the first few injections. No symptoms of iodoform intoxication were noted, and unless ether is used as a solvent there seems little danger from these parenchymatous injections.[1]

ANEURISM.

Five patients have applied for treatment on account of aneurisms. Three of these have been of the popliteal artery, one was a left femoral varicose aneurism, and the fifth a diffuse traumatic aneurism at the middle of the arm. Two of the cases of popliteal aneurism were cured by compression; in one this failed.

CASE I. *Popliteal aneurism.*—Mr. B., aged twenty-five years, was sent by his physician, Dr. Alison, on account of a pulsating tumor about the size of a goose-egg in the right popliteal space. Digital pressure was applied for forty-two hours; this resulted in considerable reduction in the size of the aneurism as well as in its pulsation. Careful palpation, however, demonstrated that a small quantity of blood was still passing through the sac. Rapid cure by Esmarch's bandage was then attempted, the elastic roller being firmly applied above and below the aneurism and carried over the

[1] During the last year, Dr. White has had a successful result in a case of obstinately recurring tubercular caries of the trochanteric region, which had resisted three extensive operations, by the free use of a 25 per cent. emulsion of iodoform in boro-glyceride. This was injected into sinuses and retained by packing. The patient has for the first time in three years a firm, healthy cicatrix, already six months old, and has no symptoms of bone trouble. The case is not included in the above series, as she was not treated in the hospital.

latter with very light pressure. After two hours' trial of this method the compression was suspended, and the patient allowed to rest for a few days, when the femoral artery was ligated at the apex of Scarpa's triangle. The after-treatment consisted in elevating the limb on a pillow and enveloping it in cotton. The wound healed by first intention, and the patient recovered without incident. The circulation in the limb remained fair throughout. This was probably largely assisted by the preliminary digital compression. This was a most unfavorable case, owing to the poor constitution of the patient, who was the subject of advanced mitral heart disease, and was also a confirmed rheumatic. He had a small aneurism of the left axillary artery, which did not tend to increase in size, and was therefore not treated, but simply kept under observation. For these reasons it was feared that ligature of the artery might lead to the development of another aneurism at the seat of ligation, but this has not occurred.

CASE II.—H. L., aged forty-two years; colored; had acute articular rheumatism and smallpox in 1862; had engaged to excess in athletic exercises. In the spring of 1891 pain and a sensation of weakness in the right popliteal space were first noticed. In the following fall he detected a pulsating swelling. In January, 1892, he came to the hospital. The treatment consisted of rest in bed, with the limb flexed and elevated on a pillow. Iodide of potassium and aconite were administered internally, and digital pressure of the femoral was continued for fifty-four hours, after which moderate pressure was kept up by a horseshoe tourniquet for ten hours; a roller bandage was then placed in the bend of the knee, and the limb flexed, bandaged, and retained in the flexed position. During the treatment the aneurismal sac gradually diminished in size; pulsation entirely ceased, and did not return. The patient was allowed to get out of bed at the expiration of a month, and he left the hospital entirely cured.

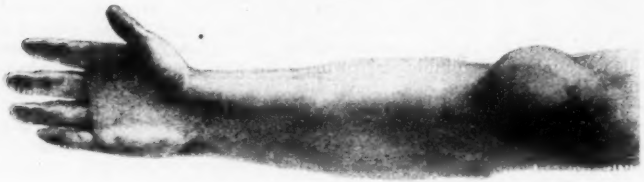
CASE III. *Popliteal aneurism.*—T. G., male, aged thirty-two years, presented an aneurism of moderate size in the popliteal space, which was treated as in the preceding case, with the same result.

CASE IV. *Left femoral varicose aneurism.*—Mr. K., aged twenty-nine years, came for treatment on account of a large pulsating tumor just below Poupart's ligament, the result of an old gunshot wound. The swelling presented the typical symptoms of a varicose aneurism. Ligature of the iliac was advised. This being positively refused, pressure by means of shot-bags was applied for four weeks. Partial consolidation of the aneurism apparently resulted, but later rupture occurred, with enormous extravasation into the tissues of the thigh. In consequence, amputation just below the trochanter was necessitated in spite of the patient's unfavorable condition. The patient suffered from an extreme degree of shock, both before and after operation. Death occurred in seventy-nine hours, without reaction having occurred. The external iliac vein and artery were enormously dilated; the vein was as large as the small intestine, the artery three times its normal calibre; the walls were exceedingly thin, and rupture of the vein had taken place about the level of Poupart's ligament. The channel of communication between the two vessels was scarcely large enough to thrust a lead-pencil through.

CASE V. *Diffuse traumatic aneurism.*—W. S., aged fifty-three years, received a shot from a 32-calibre revolver eleven years ago, the ball entering the arm anteriorly at the junction of the middle and lower thirds, passing out posteriorly. He bled freely. A wound of the brachial artery was diagnosticated; hemorrhage was checked by packing. After cicatrization, a hard mass about two inches in circumference remained. This became painful when he did any hard work. During the four or five weeks previous to admission the tumor became very sensitive, the surrounding tissues were inflamed, and severe lancinating pains shot through the hand and forearm. Suddenly the tumor began to enlarge, and was found to be pulsating. The patient was brought at once to the hospital, and was found to be suffering from a diffuse traumatic aneurism. The entire arm was enormously swollen (Fig. 6), the pulse at the wrist was lost, and the hand was cold. *Operation*: An Esmarch

bandage and tube were applied and a free incision was made in the line of the brachial artery. All the tissues were infiltrated with clotted blood and

FIG. 6.



Diffuse traumatic aneurism of the brachial artery.

matted by inflammatory exudate. The sac was freely opened (Fig. 7), and all the clots were turned out. The ruptured artery was found and traced up to a point where its walls were healthy, and there tied with catgut. The distal

FIG. 7.

Traumatic aneurism laid open and vessels tied.

vessels were more difficult to find, but were finally secured. The wound was drained and closed. The arm was put on an anterior splint and elevated. The radial pulse appeared on the second day. Healing by granulation followed, and the patient recovered without the slightest impairment of function.

"Murray's treatment"—that is, encouraging the rapid formation of a red clot by firmly applying an Esmarch bandage below the aneurism, carrying it lightly over the distended sac, then occasioning further engorgement and blood stasis by taking four turns of the Esmarch above the aneurism—was not successful in the single case in which it was applied. Against digital pressure the objection has been raised that it so contuses the parts that should a subsequent ligation be necessary, the risks of operation are greatly increased. Our experience has not corroborated this theoretical objection, which is more than counterbalanced by the establishment of collateral circulation, which digital pressure favors. Ligation above and below, with excision of the sac, is the method preferred in this service in cases of traumatic aneurism, whether diffused or circumscribed.

EXCISION OF THE ELBOW.

Eight excisions of the elbow have been performed. The posterior straight incision was employed. Whenever possible the periosteum was carefully dissected from the bones. The brachial artery at the bend of the elbow, and the ulnar nerve as it passes in the groove between the olecranon and the internal condyle, are the important structures to be avoided. The attachments of the brachialis anticus and biceps in front, and of the triceps and anconeus behind, were spared as far as possible. The wounds have always been drained through and through. Anterior angular splints were used.

Particular attention was paid to the after-treatment. At each dressing gentle passive motion was made, and until the wound healed splints with different angles were applied when the dressing was changed. When gentle passive motion occasioned much pain, or did not seem to result in sufficient freedom of flexion and extension, ether was given to the full stage of anæsthesia and moderate force was employed. In some cases this was repeated twice a week for months at a time. In the arthritic cases the nutrition of the wasted muscles was restored by faradism and massage repeated daily, splints were discarded after the seventh day, and patients were encouraged to use the arm.

CASE I. *Luxation and necrosis.*—T. H., aged twenty-nine years, injured the elbow-joint by falling three months previously. This injury was diagnosticated as a fracture, and the arm dressed in plaster-of-Paris. In a short time this was substituted by a felt splint, and passive motion was begun. As the arm remained swollen, without motion at the elbow, and with neither motion nor sensation of the fingers, he was brought to the hospital. A large collection of pus about the joint was evacuated, the radius and ulna were found displaced posteriorly, and the head of the radius and condyles of the humerus were necrosed. Excision of the joint was performed. The patient recovered with moderate motion in the joint and a return of motion and sensation in the fingers.

CASE II. *Old fracture; vicious union.*—Willie W., aged nine years; eleven weeks before admission, fell and sustained an injury in the neighborhood of the elbow-joint. An anterior obtuse-angle splint was applied. After recovery the joint was found to be immovable; for the relief of this condition he was brought to the hospital. On examination the internal condyle was found to be absent from its normal position, and in front of the joint there was felt a hard, bony mass, which was thought to be the displaced condyle, increased in size by the formation of callus, and mechanically interfering with the movements of the joint. An incision being made, the diagnosis was found to have been correct. The joint itself was normal. The obstruction was removed. Rapid healing occurred, and a joint functionally perfect resulted.

CASE III. *Septic arthritis.*—Theresa H., aged twenty two years, following an abortion, was seized with acute inflammation of the elbow-joint. This was treated by rest, ichthyol ointment, and later by blisters. Improvement was very slow, and the patient passed from observation. She returned later, however, free from the symptoms of inflammation of the joint, but with such firm ankylosis in the position of full extension that excision was necessitated. Healing was prompt. A considerable range of motion was preserved in the joint, which she was able to use for all domestic work.

CASE IV. *Tubercular arthritis.*—Boy, aged three years, suffering from tuber-

cular joint disease, with profuse suppuration. There was much wasting. On incision, the joint was found disorganized, and the ends of the bones carious. Resection was performed and the wound drained. The patient made a good recovery, with a functionally satisfactory joint.

CASE V. *Suppurating tubercular joint.*—Male, aged forty-six years, partially ankylosed in the extended position. Excision was performed. The functional result was satisfactory.

CASE VI. *Tubercular arthritis.*—S. R., male, aged forty years. An abscess was evacuated, and the joint explored. Caries of the coronoid process, and of the internal condyle was found. These diseased portions were removed. The patient recovered with a useful joint.

CASE VII. *Necrosis* —E. B., male, aged four and a half years, was subjected to excision of the elbow, on account of necrosis of this joint following injury. The patient made a satisfactory recovery, with a fair range of motion.

CASE VIII. *Tubercular arthritis.*—Female, aged three years. Tubercular arthritis, with extensive involvement of the soft parts. Excision was performed; a functionally useful joint resulted.

LUPUS OF FACE; CURE BY TUBERCULIN.

Mr. J. W., of Titusville, aged fifty-nine years in 1890, had been under treatment for two and a half years for an ulcer of the face, occupying the left cheek, the parotid region, and the side of the neck, and measuring on an average about four inches in diameter. (Fig. 8.) It began on the side of

FIG. 8.

Lupus of face and neck.

the face in front of the upper portion of the ear, as a small scab, which steadily extended, and under which ulceration developed.

The diagnosis by the various surgeons whom he had consulted, and who treated him, had been epithelioma. He had been in the hands of four men of experience, some of them of excellent position in the profession. He had had eight cutting operations performed, besides numerous plasters and other local applications.

At the time he came under my care I was using the newly-discovered

Koch's lymph, now known as *tuberculin*, or *paratoloid*. He remained in Philadelphia three weeks, during which time he received in the lumbar region six injections of this material, beginning with 0.1 milligramme, and increasing in strength up to 0.5 milligramme each. A distinct local reaction (at the side of the sore) occurred after each injection, diminishing in intensity with the later ones; no local treatment was employed. At the end of the three weeks healing had so far progressed that it was thought proper to let him go home, and ten days later the ulcer was entirely healed. He now, twenty-three months later, presents a sound and permanent scar. There has never been the slightest solution of continuity since that time. The illustration (Fig. 9) shows the extent and position of the cicatrix.

FIG. 9.

Effect of treatment by injections of tuberculin (Koch's lymph).

This case is of more than usual interest on account of the length of time which has now elapsed since cicatrization occurred. As yet but few permanent cures by the use of paratoloid have been reported. Cheyne, by a system of continuous and increasing dosage, has obtained rapid healing in a number of cases, which remained in good condition for some weeks. In this patient the previous failure of a number of operative procedures, and a great variety of local applications, and the prompt, satisfactory, and apparently permanent healing which followed the use of tuberculin, all local treatment being withdrawn, strongly emphasize the unique properties of that remedy. It would seem that even if success from its use is only occasional, it may occur in such desperate and otherwise hopeless cases that it is worth more frequent trial than the profession, in the reaction from its too extravagant anticipations, is now giving it.

DELAYED UNION AND UNUNITED FRACTURES.

Cases of delayed union and ununited fracture in this service are treated according to their duration, in the following manner: Recent cases, by reapplication of dressings insuring perfect immobilization; older cases, by frictions or by encouraging the functional use of the limb, aiding it by means of apparatus; still older cases, by resection of the ends of the fragments and fixation by splints, or, if the position favors it, by pins. The use of wire has been abandoned as altogether unsatisfactory. When large portions of bone have been removed, and very long continuance, or extensive disease, or unfavorable position of the fracture, demand both absolute fixation and stimulation of condensed and atrophied bone, the plate figured on page 54, and used in cases V. and VII., has been found invaluable. Hennequin[1] has recently published a series of unsuccessful cases of osteotomy and wiring for ununited fracture, and is inclined to attribute his failures to some constitutional condition interfering with repair. They certainly illustrate the need for some more thorough and satisfactory method of fixation than the wire suture. This we believe will be found in the use of this plate in appropriate cases.

CASE I.—Man; fractured clavicle six weeks old, treated by Velpeau bandage. There was no bony union. The man was put to bed, in the supine position, on a hard mattress, and with a very small pillow for the head. At the end of a month the bone was firmly united.

CASE II.—Boy, aged eleven years; fracture of the upper third of the femur. Treatment: extension and sandbags. Distinct motion was found at the end of six weeks; moderate friction was made, and the dressings reapplied. Four weeks later there was no improvement. The boy was then etherized, and the fragments vigorously rubbed together. The same dressings were reapplied. Six weeks later firm union was found to have occurred.

CASE III.—W. S., male; fracture of the tibia two months before coming under observation. Union had not occurred, although friction had been practised. The bone was in good position, and it was therefore thought best to get the patient about. A brace was ordered, and the patient was allowed to walk. At the end of six weeks the bone had united perfectly.

These three cases illustrate as many methods of treating delayed union. In the first, perfect rest was followed by healing. In the second case vigorous friction, followed by immobilization, was necessary. In the third case, the continued irritation produced by walking was necessary to effect a cure.

CASE IV.—A railroad employé applied for treatment on account of an ununited fracture of the left ulna, at the junction of the middle and upper thirds. The condition was of some months' standing; the usual milder measures had been unsuccessfully employed before coming to the hospital. Crepitus and motion at the seat of the fracture were very apparent. An incision was made over the seat of injury, and after the soft parts had been dissected away, an S-shaped fracture was found. The dense fibrous tissue and lymph between the ends of the bone were removed with a small chisel

[1] Revue de Chirurgie, August, 1892.

without altering the line of fracture. The two ends of the bone were then drilled, and held together by a single screw. The wound was dressed antiseptically, an anterior splint applied, and the arm suspended in a sling. At the end of a month the screw was removed, when firm union was found to have occurred. The tract left after the removal of the screw closed by granulation in about a week, and the patient was dismissed well.

CASE V.—Miss J., nineteen years of age, received a compound fracture of the humerus, about two inches below the acromion, the result of a fall eighteen months before coming to the hospital. At the time of the accident an internal angular splint was applied. The bone made no attempt at union; the ends were therefore rubbed together and the splint reapplied, but without success. The attending physician then cut down on the seat of fracture and curetted the ends of the bone, and the arm was again fixed with a splint. Union still did not occur. She then consulted a surgeon, who drilled and wired the fragments. The bone not only failed to unite, but an infected sinus remained open. She then came to the University Hospital. The seat of injury was cut down upon, and by means of the chisel and saw, an oblique section of each bone was made and the freshened surfaces placed in apposition, and secured by a long screw. The sections of bone were eburnated and non-vascular, and promised but feeble reparative efforts. The screw became loose in about three weeks, and was removed. At the end of six weeks the wound had completely healed, but the bone had not united. After an interval of some weeks another attempt was made to restore the patient a useful arm. An incision was made in the line of the old cicatrix; transverse sections of the bone were made until the cut surface appeared healthy. After accurately fitting the ends together two holes were bored in each fragment of bone corresponding to the holes in a metal plate prepared to retain the fragments. Screws were then passed through the plate into the bone, thus holding the fragments in close and fixed apposition. The arm was dressed to the side and kept immobile for seven weeks, when the patient was again etherized for the purpose of removing the plate. Ten days later the external wound was firmly healed, and a careful examination showed that the bone had united firmly.

CASE VI.—Mr. J. presented the characteristic deformity of a Pott's fracture, which had occurred nine months previously, which had become exaggerated by attempts at walking. Examination showed the internal malleolus to be absent from its normal position, and a prominence was felt in front of the astragalus. Crepitus and preternatural mobility were detected in the fibula about three inches above the external malleolus. An incision was made along the inner border of the tibia and extended to the tuberosity of the scaphoid. The displaced internal condyle was chiselled loose, and the surface freshened for it in its normal position, where it was wired. An incision was made over the seat of fracture in the fibula, and after considerable dissection and the free use of the chisel, the fragments were restored to their proper position. Drainage-tubes were inserted, the wounds were dressed antiseptically, and the foot was placed in a fracture-box. At the end of six weeks the patient was allowed to go about with a plaster-of-Paris dressing on the foot. The result was highly satisfactory; all deformity had disappeared, the patient walked with ease with a cane, and a considerable degree of motion returned in the ankle.

CASE VII.—Mrs. R., aged forty-two years, was brought to the hospital by Dr. Downs, of Dover, Del., on account of an ununited fracture of the humerus. Eight years ago the patient first experienced an aching pain in the right arm; this steadily grew worse. The elbow-joint became somewhat stiff, and was at times swollen as were also the hand and forearm. There was marked loss of power, and the hand could not be carried to the head. Examination during this period failed to show any cause for her suffering, and the trouble was considered to be rheumatic. The patient had had attacks of pain over the left chest, which were attributed to rheumatism. Otherwise her health

had always been good. Some of her mother's family were consumptive, and one maternal aunt died of cancer of the breast.

Without any apparent change in her condition, the right humerus broke at the junction of the upper and middle thirds, in August last, while the patient was in the act of raising her nine-months old baby to her shoulder. A posterior splint was applied with an anterior trough. As this failed to fix the fragments, a plaster cast was applied. It was found necessary to change this every week as it became loose. After wearing the cast six weeks continuously the fracture had failed to unite and the patient was sent to Dr. White. Crepitus was distinct on motion, and there was no callus thrown out about the ends of the bone. The pain in the arm was relieved in part after the fracture had occurred.

When exposed by incision the seat of fracture was found to be enveloped in a mass of partially organized tissue strongly suggesting sarcoma; on carrying the knife through this down to the bone, there escaped several drachms of thick liquid containing fibrinous shreds, much like the contents of a cold abscess. There was absolutely no attempt at repair. The ends of the bone were irregular, jagged, and partly absorbed. They were resected, exposing beyond the area of partial absorption dense eburnation. Additional cross-sections were removed till the bone appeared fairly healthy and distinctly vascular. In all, an inch and a quarter of the shaft of the humerus was resected.

After securing good apposition of the two freshened bone-ends, the plate shown in Fig. 10 was put in position. (Fig. 11.) Four holes were drilled.

Fig. 10.

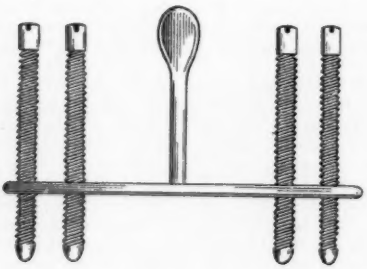


Plate for fixation of ununited fracture after resection.

Fig 11.

Diagram of plate in position: Case VII. (Cf. Case V.)

This plate held the bone so firmly that on raising the arm by the elbow the humerus moved as a whole, exactly as though there was no fracture. The wound was packed with iodoform gauze and a pasteboard moulded splint embracing the shoulder, arm, elbow, and forearm was so applied that without removing the splint the dressings could be changed.

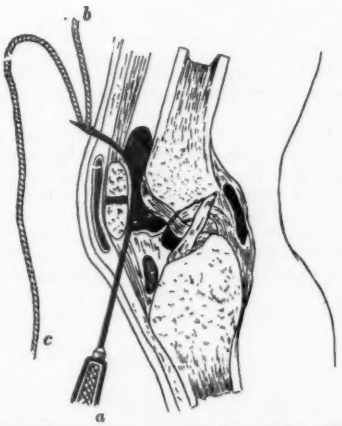
The wound remained sterile for many days, then there was some suppuration. The patient has felt no motion in the arm, none has been detected during the occasional changes of the splint, and the pain from which she suffered for eight years is entirely relieved. It is too soon yet to decide whether there will be bony union or not.

FRACTURE OF PATELLA.

In this relation two cases of fracture of the patella may be described, which were both subjected to operative interference:

CASE I. *Barker's method.*—A man, aged twenty-three years, broke his patella by making a misstep in alighting from a train. He was seen the next day. The joint was distended with blood and the fragments were widely separated. Barker's operation, the most recent operative procedure in this fracture, was performed as follows: The lower fragment of the patella was steadied by the finger and thumb, and a narrow-bladed knife thrust into the joint, edge upward, in the middle line of the ligamentum patellæ at its attachment to the lower fragment. Through the wound thus made a stout-handled pedicle needle was thrust into the joint behind the lower fragment, and pushed up behind the upper fragment and through the quadriceps tendon in the middle line as close to the border of the bone as possible, the upper fragment at this time being forced down and steadied. When the point of the needle became apparent beneath the skin the latter was drawn upward and an incision made upon the needle, the eye of which was then threaded with sterilized silk or wire (Fig. 12) and the needle withdrawn, carrying the thread

FIG. 12.

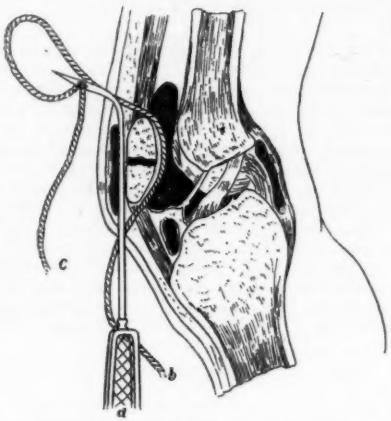


Barker's operation for transverse fracture of the patella. First stage. *a*. Needle. *b*. End of ligature to be threaded and conducted behind fragments. *c* Free end of ligature to be brought in front of fragments.

behind the fragments. The needle was next unthreaded and passed through the same skin wound below and out of the upper wound, but this time in front of and close to both fragments. Here it was threaded with the upper end of the suture (Fig. 13) and withdrawn. The two fragments were then brought together, friction was made to displace clots or other foreign material, and the ligature tied tightly over the lower border of the patella. The two ends of the ligature were cut short and the wound closed. Union of the skin wounds was by first intention. Passive motion was begun on the tenth day. The patient was out of bed on the thirteenth day, walking without much difficulty. He left the hospital at the end of three weeks with a very useful

knee. The range of motion and general usefulness are now (November 19), ten months after the injury, as good as on the other side.

FIG. 13.



Barker's operation for transverse fracture of the patella. Second stage. *a*. Needle. *b*. Inner portion of ligature in position. *c*. Opposite end of ligature threaded and ready for withdrawal, leaving it in front of the fragments.

CASE II. *Stimson's method.*—This patient was also a young man in whom the fracture was the result of muscular action. He was seen the day of the accident. A strong silk suture was carried, by means of a perineal needle, through the ligamentum patellæ, up by the side of the patella, then through the quadriceps tendon, and down to make its final exit at the point of beginning. It was then drawn tight and knotted, while the fragments were approximated. The ends were cut short, and it was left as a buried suture. At the end of three weeks there was still slight motion between the fragments. At five weeks the patient was discharged, with very close fibrous union, and with excellent use of the limb.

HEAD INJURIES.

All depressed fractures, whether simple or compound, or whether brain symptoms were present or absent, were elevated. This treatment is in accordance with the practice of the great majority of modern surgeons; and in view of the number of cases not thus treated, who suffer from various forms of cerebral irritation or disease, it seems unfortunate that it was not the rule of practice long ago. The operation in itself is almost free from risk. Some of the simpler cases were closed without drainage; the compound comminuted fractures were drained by silk or a small tube.

Trephining.—Of eight cases, six recovered and two died. The two fatal cases succumbed soon after admission from the violence of the injuries. In one instance there was extensive fracture at the base with

laceration of the brain. In the other case there was much laceration of brain tissue at the seat of fracture. The patient died without reacting.

One patient was trephined for *traumatic epilepsy*. A flap was raised which included the scar of an old injury, and a button of bone was removed. The bone section showed eburnation. The opening was enlarged with the rongeur until the skull presented a healthy appearance. A mass of greatly thickened dura was removed. Union by first intention was obtained. The patient had no more fits while in the hospital. A recent note from his physician, Dr. I. N. Leyda, of Allegheny, Pa., states that for six months after returning to his home he remained absolutely well. Later light attacks recurred, which gradually became more frequent, and his intellect failed. He died recently from rupture of a cerebral artery.

In four cases of *epilepsy* following blows upon the head, the scar resulting from the injury was excised. Primary union followed in all cases, and all remained free from convulsions during their stay in the hospital, and for various periods subsequently. These cases, added to those I have previously reported,[1] make twenty-four cases of supposed traumatic epilepsy, all of which were at least temporarily benefited by operation.

Trephining for old depressed fracture, with delusions of persecution.—S. S., aged fifty-seven years, sent by Dr. Allport, of Phillipsburg, Pa., received a head injury twenty years before coming under observation. Two years before admission it was noticed that his memory was beginning to fail, he became irritable, and was the victim of delusions of persecution. He was rational on most affairs, but had delusions of persecution. Examination of the head showed a depressed scar on the right side, in front of the parietal eminence, and two inches from the median line. The bone was found to be deficient, and the pulsations of the brain could be felt through the scalp. A flap was raised in the usual manner. As it was being dissected from the edges of the opening in the skull a cyst was exposed, about the size of a pigeon's egg, which was encroaching upon the brain substance. The cyst was opened and drained. Its wall was thin, and through it could be plainly seen the brain convolutions beneath. Following the operation there was marked improvement. The delusions entirely left him, and he was able to pursue his business for upward of eight months, when in an altercation he received a heavy blow upon the head. Shortly after, his delusions recurred. He was then readmitted to the hospital, and again operated upon on November 9, 1892. The cyst was found to be obliterated, its site being occupied by a dense fibrous mass, a quarter to three-eighths of an inch in thickness, consisting undoubtedly of the collapsed cyst walls, and constituting practically a thickened scar of brain tissue. This was dissected out, together with some healthy brain structure on either side. The wound healed in five days by first intention. The immediate effects of the operation are most striking. The patient, who for the week previous had required constant watching and restraint, and was gloomy when he was not violent, became at once rational, cheerful, and docile, and so remains. It is too much to hope, however, that this will be permanent.

Persistent headache.—Florence C., aged twelve years, received a scalp wound at the age of eight years. This suppurated for a long time. A year later she began to suffer from severe headache. For three years this was constant and increasing in severity, so that she had to be taken from school. The scar was excised and a button of bone was removed. The operation afforded

[1] Annals of Surgery, August and September, 1891.

immediate relief, the pain has not recurred, and the child has attended school regularly.

Compound comminuted fracture over the superior longitudinal sinus.—M. S., aged thirty years. The bone was driven into the brain to the depth of an inch. On elevating it there was furious hemorrhage, the sinus having been torn completely across. The hemorrhage was checked by iodoform packing, and the patient made an uninterrupted recovery, returning to his work in six weeks.

(*To be continued.*)

THE CHOLERA OF 1892 IN NEW YORK: ITS PROPHYLAXIS AND TREATMENT.

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The record of the cholera in New York Harbor during the present year will be handed down as a memorable one. The lessons which it teaches are important; it is to be hoped that they will not be received in inattentive ears. The prophylaxis of cholera demands attention to certain details; had these been observed there would not have been any cholera in New York Harbor. The present Health Officer had been in office but four days, after his appointment last spring, when typhus fever broke out in the city of New York, being brought in by the Massilia, a steamer passed by his predecessor after inspection by his (predecessor's) deputy. This experience was sufficient to put the entire *personnel* of the office to their best efforts that a similar misfortune should not again befall the largest *entrepôt* of the Western continent. Systematic disinfection of the baggage of immigrants from the Continent and Russia, and later of that from Poland, was begun. At the first report of cholera, knowing full well its predilection for beaten routes of travel, the steamship companies were requested to disinfect baggage and to make special medical inspections at the point of embarkation. On August 19th, on information that the disease was suspiciously near the German frontier, the Department of State was requested to make inquiries through consuls to ascertain if cholera existed in Germany. On the 23d, having received reports from Bremen, Hamburg, and Stettin, the two latter being unsatisfactory, the Hamburg-American Steamship Company was notified by the Health Officer to use great caution, to disinfect baggage and clothing, and detain passengers at Hamburg for five days. How far these orders were carried out was ascertained on the arrival of the Moravia on the 30th, when it was learned that the immigrants had embarked immediately upon the arrival of the train, and that there had been twenty-two deaths among twenty-four patients, the first case occurring on the first day after leaving Hamburg. It is evident that cholera

gained its entrance into New York Harbor solely by the negligence of the steamship company. The disease can be stamped out on shipboard in five days by competent medical officers, and should be done at sea. Under the direction of the Health Officer it was done in every case after the steamships came under his jurisdiction in New York Harbor. The sick and dead were removed. The immigrants received baths, having been previously rubbed with a bountiful supply of green soap. A sail, suspended by the four corners, the water being constantly renewed, was an excellent, though an improvised bath-tub. The crew's quarters and the steerage were scrubbed and washed out with a 1 : 500 solution of corrosive sublimate. The fumigation with sulphur was carried out. The baggage and clothing were disinfected by sulphur, superheated steam, and, when injury would not be done, by corrosive sublimate solution. Soiled bedding and clothing were wrapped in sheets wetted in corrosive sublimate solution and burned in the furnaces. Lastly, fresh water was supplied and only used after boiling. Proper regard for the lives of passengers demands that this work shall be done at sea. It only requires competent medical officers to carry it out.

The observation station is Hoffman Island. Although much of the plant bears evidence of niggardly legislation and ancient notions of disinfection, on the whole it is in good condition and suitable for the purposes for which it is designed. The island accommodates about eight hundred persons, in eight divisions. There is no soil upon the island, asphalt covering the entire space, thus affording opportunity for thorough flushing with disinfectants. A high fence prevents forbidden ingress or egress, and even the passage of contagious material into the sea. The *latrines* are provided with pans containing disinfectants, so that untreated *dejecta* cannot have access to the sea. There are ample arrangements for the disinfection of clothing and effects by superheated steam, or by exposure to burning sulphur for six hours, being loosely unfolded in bins; and for the use of bichloride solutions upon trunks, bags, boots, etc. All improvements which have been recommended by the different advisory boards before this epidemic have been in the main and essential part carried out. The work done at Hoffman Island is shown by the following table:

Steamer.	Quarantined.	Discharged.	Number of passengers.	Pieces of clothing and effects disinfected by		
				Sulphur.	Superheated steam.	Corrosive sublimate.
Normannia . . .	Sept. 4	Sept. 19	566	850	2800	1850
Rugia	Sept. 9	Sept. 19	419	520	1850	1360
Scandia	Sept. 19	Sept. 28	938	1800	3500	1200
Bohemia	Sept. 30	Oct. 8	605	1150	2200	1560

On admission to the island all were bathed; the total number of baths was 2634. There were 111 cases of illness and 2 deaths. Fifty cases were transferred to Swinburne Island for treatment, including about thirty cases of measles from the Scandia.

The thoroughness of the work done on board the vessels and at Hoffman Island is shown by the result—the absolute prevention of the entrance of cholera into the United States. The imposition of the twenty-day limit by President Harrison, on September 1st, had nothing to do with the result, although it somewhat lightened the labors of the Health Officer by its practical restriction of immigration. The magnitude of the work at the Quarantine Station in New York Harbor is shown by the following table:

Inspections at Quarantine, August 31 to October 14, 1892.

Crews	34,612
First cabin	17,330
Second cabin	13,054
Steerage	15,081
Total	80,077

When it is borne in mind that no case of this disease escaped the vigilance of Quarantine, the care, skill, and systematic thoroughness are apparent and should receive due acknowledgment.

The problem presented by the Normannia was a peculiar one. There had been deaths in both the first and second cabins during the voyage. It was impossible to definitely ascertain the cause of these deaths; besides, there were in the steerage American citizens entitled to the same protection as that afforded to the cabin passengers. No advisory board, nor quarantine commission, nor legislature had contemplated the necessity of keeping cabin passengers under observation. Unfortunately legislatures are not in session when epidemics are imminent. On September 8th a case of cholera was found in the person of a member of the crew, which necessitated the isolation and disinfection of the kitchen force. The difficulty of procuring vessels to remove the passengers was almost insurmountable, but the timely generosity of a private citizen solved the problem. The prompt acquisition of Fire Island secured a site, hitherto unneeded, suitable and ample for all requirements. The prompt action of Governor Flower in meeting this emergency was no less notable than his decision in calling upon the military forces in the interest of law, order, and humanity, to disperse the howling mob of Southside barbarians who sought to defy his authority. The prophylaxis was efficient, yet simple and thoroughly carried out.

Whether we can ever rely upon internal hygiene, as does Great

Britain, is an open question. We have no cholera-breeding dependency against which we dare not quarantine; nor, indeed, do we believe the British idea to be practicable for this country. Commerce must be as little interfered with as is possible, for this means commercial loss. Marine detention is alone effective, and for this islands or vessels are necessary. Every land *cordon sanitaire* has been broken through even when instituted under the most favorable circumstances. On the other hand, when one considers that nearly six thousand vessels from foreign ports, besides several thousand engaged in coastwise commerce, are inspected each year at the port of New York, the impossibility of finding safe and suitable anchorage during their detention is obvious. Besides, it is a fundamental tenet of maritime law that an infected vessel shall have its passengers and crew removed at the earliest possible moment. Whether the work of prophylaxis can be better accomplished under National supervision is, at the present time, largely discussed. New York, to day, with few and insignificant exceptions, has nothing but praise for the brilliant success of the present conduct of affairs. Every argument for National supervision applies equally well to the present *régime*, and we believe that the centralization of authority would in this case, as in other instances, result in a less efficient *personnel* and a less direct responsibility than exists at present. The interests of the city of New York are greater than of all the rest of the country. These interests demand and will secure competent and skilful officers, faithfully and fearlessly conducting, in the light of the latest and best scientific knowledge, the affairs of Quarantine. The plant is established, is sufficient for present necessities, and can be increased to meet the demands of the future. Past experience has taught the officers the necessity of keeping watch of the epidemics in foreign lands, and the information possessed by the Health Officers of the port of New York in the past, as it was in the present instance, has been very accurate and of earlier date than that possessed by the Department of State at Washington. If argument were needed, the brilliant success attained this year should be a conclusive one.

At Swinburne Island there are ten wards, accommodating about three hundred persons. The buildings are old, but in good repair and well adapted to all requirements. The treatment here carried out was essentially surgical in bearing, especially in the stage of asphyxia. In the premonitory diarrhœa, if there was no collapse, the first step was to clear the bowels, which was done by the administration of ten grains of calomel by the mouth, and this was repeated every hour until three doses were taken, or thorough evacuation secured. Afterward, one half grain was administered every two hours. Stimulants were used as required, preferably brandy, and generally administered hypodermatically. In the stage of asphyxia the stomach and bowels were thoroughly washed

out. For the stomach the Faucher tube was used for the purpose of introducing the 1 : 1000 solution of hydrochloric acid. The procedure was repeated every two hours. The intestines were washed out with a two per cent. aqueous solution of tannic acid, half a gallon being used at a time, at a temperature of 108.9° F., and repeated every two hours. A long (two feet) rectal tube was employed, the patient lying upon the back, and gentle massage was indicated if there was any difficulty in the passage of the fluid beyond the ileo-cæcal valve. The purpose of this procedure was—(1) to wash out the intestines; (2) to precipitate the ptomaïnes; (3) to warm the body. After each injection the bodily temperature rose from one to three degrees F.

When the pulse began to disappear and respiration became shallow, then hypodermoclysis was resorted to. The solution employed was sodium chloride, 3 parts; brandy, 10 parts, to 1000 parts of sterilized water kept at a temperature of 104° F. One quart was used for an adult, and it was injected into the flanks at about the eighth rib, and was repeated every second to fifth hour, according to the necessities of the case. The largest amount used in any one case was eleven quarts. In several cases inhalations of oxygen at the rate of a gallon every hour, watching the heart, were resorted to. No nourishment was administered while vomiting persisted. At other times peptonized beef, champagne, and milk with carbonated water—three parts of the former to one of the latter—were employed. The distressing cramps were avoided in all but two cases by placing the patients in a warm atmosphere, in their beds, near the steam-radiators, and building a tent over them, so that they would be in a current of hot air. During convalescence a simple and nourishing diet was insisted upon. The work done at Swinburne Island can be summed up as follows: Fifty-six suspected cases were received, all of which, ten being excepted, presented marked premonitory symptoms. All cases entered at the Island received a hot bath on admission, and were kept in bed. All suspicious cases drank freely of hydrochloric acid lemonade, of the strength of 1 : 1000. Seventy-two cases of Asiatic cholera were treated, eight of them being light cases. Of these cases twenty died, six of them within two hours after admission. Of these twenty deaths three can be attributed to other causes, because they had recovered from the stage of asphyxia; two of these died from a pneumonia of the right lower lobe, one died from nephritis. So that but seventeen deaths are justly attributable to the cholera—dying in the period of asphyxia. The duration of convalescence was about fourteen days. It is especially notable that opium had no place in the treatment, the laboratory experiments of Koch showing conclusively that the administration of this drug favors the development and progress of the disease. The virulence of the epidemic of 1892 was shown by the fact that a large number of cases became fatal within four hours after admis-

sion, thus rendering the time of efficient service a brief one. The bodies of all persons dying from cholera were cremated, as well as those of twenty-four persons who died upon the steamships while in New York Harbor.

The writer would express his appreciation of the courtesies extended to him by the Hon. Charles F. Allen, State Commissioner of Quarantine; William T. Jenkins, M.D., Health Officer, and his personal staff; and by J. M. Byron, M.D., Physician at Swinburne Island, in their placing at his disposal every opportunity afforded by the service to facilitate the study of this subject.

HISTORY OF THE RECENT OUTBREAK OF EPIDEMIC CHOLERA IN NEW YORK.

By Hermann M. Biggs, M.D.,

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The Moravia, the first vessel infected with cholera to arrive in New York, reached Quarantine on August 31st, having sailed from Hamburg on August 16th. She reported twenty-two deaths during the voyage from gastro-intestinal disorders. The official cholera statistics of Hamburg now show that cholera was recognized as existing there on August 11th. On September 3d, three days after the arrival of the Moravia, the Normannia and the Rugia reached New York. Each of these vessels reported a number of deaths at sea from cholerine, and on their arrival in New York there were four cases of cholerine (so called) on the Normannia and five cases on the Rugia.

In addition to these three vessels, later came the Scandia, Heligoland, and Bohemia, all from Hamburg, which, on their arrival, reported deaths at sea from gastro-intestinal diseases. These six vessels were detained at the lower quarantine station. The Wyoming, from Liverpool, arrived with apparently a clean bill of health, but before her discharge from quarantine, while she was lying at the upper quarantine station, several cases of cholera appeared among her passengers, and she was sent back to join the cholera fleet in the lower bay.

One case occurred on the State of Nevada, from Glasgow, after she had been cleared at quarantine and while she was lying at her dock. Whether this case was infected in the city or on board the vessel is not known. There had been no suspicious cases on board during the voyage. The vessel, however, was ordered back to quarantine for disinfection.

I am indebted to Dr. J. M. Byron for the following table, showing the ports of departure and dates of arrival in New York of the infected

vessels, the number of cases and deaths occurring at sea and after arrival in New York, and also some other data. Dr. Byron was placed by the Health Officer in charge of Swinburne Island and of the ships at Lower Quarantine during the epidemic.

SYNOPSIS OF SICKNESS AND DEATHS ON BOARD THE CHOLERA FLEET.

(From the time of departure of the infected ships from European ports until the last case of Asiatic cholera was disposed of in Lower Quarantine, New York Bay.)

Ships.	Port of departure.	Date of arrival in New York.	Transferred to Swinburne Island.				Deaths.						
			With asphyctic cholera.	With light cholera.	Suspects.[1]	Total	At sea, cholera?	Swinburne Island.		Other places in port.		Total.	Cremated at Swinburne.
								Cholera.	Other cause.	Cholera.	Other cause.		
Moravia* . . .	Hamburg	Aug. 31	...	...	...	...	22	...	...	1	2	25	3
Normannia* . .	Hamburg	Sept. 3	12	6	18	36	5	6	...	6	1	18	13
Rugia*	Hamburg	Sept. 3	23	...	19	42	4	8	...	4	...	16	16
Wyoming* . . .	Liverpool	.....	1	...	4	5	...	1	1	2	2	6	6
Scandia* . . .	Hamburg	Sept. 9	11	2	13	26	32	1	2	7	2	44	12
Heligoland (tank)	Hamburg	.....	...	...	...	...	2	...	...	...	...	2	...
Bohemia* . . .	Hamburg	Sept. 15	17	...	2	19	11	4	1	4	1	21	10
			64	8	56	128	76	20[2]	4	24	8	132	60

All ships marked * had emigrants on board (steerage passengers). The total number of sick on board during the voyage could not be ascertained, as the existence of cholera on board was ignored by the surgeons of some vessels. It should be stated, however, that most of those who were taken sick during the voyage presented gastro-intestinal symptoms and died.

The person first affected with cholera in New York was taken ill the evening of September 5th, five days after the disease appeared in the harbor, and died September 7th. During the four weeks following, six other cases occurred in New York, and one case in New Brunswick, N. J., in which the cholera spirillum was found. In three cases, where no biological examination was made, the associations and clinical history justified a diagnosis of Asiatic cholera, thus making a total of eleven cases recognized as Asiatic cholera.

The history of the cases in which there was no doubt as to the diagnosis is, briefly, as follows:

[1] All persons taken to Swinburne Island, excepting ten, had severe gastro-intestinal symptoms.

[2] It should be observed that out of this number four patients died within two hours after admission to the hospital, and three from complications following cholera. The last case of cholera died October 5, 1892.

CASE I.—The first case in New York recognized as Asiatic cholera was taken ill on September 5th. It was that of a laborer, C. McA., single, aged thirty-two years, plasterer's helper by occupation, and lived in a tenement boarding-house on the West side, where he had been for many months. September 5th he worked as usual, returning home about 5.30, apparently well, and ate a hearty supper. During the night he suffered from diarrhœa, but went to work the following morning. About 12 o'clock he returned home, complaining of cramps and diarrhœa, without vomiting. During the afternoon he vomited once, but the diarrhœa ceased. He, however, complained constantly of very severe cramps in the abdomen and limbs. During the night he died, and a diagnosis of Asiatic cholera was made by the attending physicians, Drs. Deshon and Robertson, and the case was so reported to the Health Department. No history could be obtained of any similar illness in the house or neighborhood, and no contact could be found with any new arrivals from abroad. The autopsy was made late in the afternoon of October 7th, and showed the same post-mortem appearances and anatomical lesions as were found in the following cases; but as these were not considered entirely distinctive of Asiatic cholera, and as there was no history of contact with cases of cholera, or possible exposure to cholera infection, and as the microscopical examination of the intestinal contents was negative, a diagnosis of death from cholera morbus was returned by Dr. Dunham and the writer. However, a biological examination as a matter of routine was immediately begun, and on the evening of the 10th the cultures had progressed so far and had become so characteristic in appearance, that it was considered almost certain that the case was epidemic or Asiatic cholera. That there might be no error, however, it was not officially reported upon until several days later, after the character of the organisms found had been confirmed by other observers.

CASE II.—The second case was in the person of a butcher who was taken ill September 3d, with vomiting and diarrhœa. A day or two later he improved somewhat, went into the country for a visit, and growing worse, returned to the city September 6th. Diarrhœa persisted, and he died on the morning of September 10th.

CASE III., the wife of Case II., was taken ill the night of September 10th, with profuse watery diarrhœa and vomiting, severe cramps in the abdomen and legs, and the physician who saw her on the morning of the 11th found her in a state of collapse. She died in the afternoon of September 11th at 6 o'clock, about twenty hours after the beginning of her illness.

The physicians in attendance regarded these cases as suspicious, and so reported them to the Health Department. The patients had been residents of New York for more than thirty years, and had lived in the apartment occupied by them at the time of death for fifteen years. The husband was an employé in a tripe factory. There was no history of exposure in any possible way to cholera or to persons who had been in Europe. Nor was there anything that could be ascertained that was in the least suspicious or the least suggestive as to the manner of infection. The autopsies in these cases were not satisfactory, as the bodies had been partially embalmed, and cultures could not therefore be obtained from the intestinal contents. Fortunately, however, some of the intestinal discharges from the woman, passed during life, had been collected and sent for examination, and in these the cholera spirillum was found. No examination was made of the intestinal contents of the man.

CASE IV.—The next case was an infant, aged twenty months—child of a German laborer employed as a sweeper in a large slaughter-house. On the evening of Saturday, September 10th, at 8 o'clock, after a day of apparently perfect health, the child suddenly became ill, with profuse watery diarrhœa and vomiting. A physician was immediately called, but death ensued at 4 A.M. on September 11th, eight hours after the beginning of the illness. The anatomical lesions found at the autopsy were the same as those found in the other cases. This family lived in a tenement on the East side, far removed from any possible contact with previous cases. Two weeks previous to the illness the family was visited by two girls who had just arrived from Antwerp by the steamer Friesland. They brought with them a quantity of baggage, part of which was opened in the house, where they remained for two days. So far as could be learned, there had been no suspicious cases on the steamer, nor had these girls shown any signs of illness.

CASE V.—The day after the death of the child the father was taken ill, and suffered for a number of days with severe diarrhœa, from which he recovered. A biological examination of the intestinal contents of the child disclosed the presence of the cholera spirillum, but the intestinal discharges of the father were not examined.

CASE VI.—On September 5th, a man, a butcher by occupation, after a day spent in drinking freely of lager beer and whiskey, was taken ill at 6 P.M., with a profuse watery diarrhœa, attended with little pain. The following morning, September 6th, he vomited frequently, but went to his work, returning home at 2 P.M. From September 6th to the night of September 9th he suffered constantly from profuse watery discharges from the bowels and stomach, accompanied by severe cramps in the abdomen and limbs. There was extreme prostration. On September 10th he was much improved, and on the 11th was well, but weak.

CASE VII.—On September 12th, the wife of the preceding case was seized at 7 P.M. with profuse watery diarrhœa and vomiting, followed by severe cramps in the abdomen and limbs. These symptoms continued during the night and the following morning, until death occurred at 1 P.M., after an illness of eighteen hours. She had been in constant attendance on her husband during his illness in the preceding week. No examination of the intestinal discharges of the husband was made, as the case was not reported to the Health Department as suspicious. After the death of the wife, the case was reported as probably Asiatic cholera. The anatomical lesions found at the autopsy were the same as those found in the other cases, and the biological examination of the intestinal contents showed the presence of the cholera spirillum. There was nothing in the history of these cases or in their associations that was suggestive in the slightest degree of the source of infection.

CASE VIII.—After an interval of nearly a week, in which no cases occurred, on September 18th, at 7 P.M., a suspicious case was reported as having occurred on board the Allan Line steamer State of Nevada, lying at the foot of West Twenty-first Street. The State of Nevada sailed from Glasgow on September 3, 1892, was cleared at Quarantine September 17th with 55 emigrants, 107 second class and 115 first class passengers on board. There had been no cases of suspicious illness during the voyage and no deaths. After the vessel reached her dock on September 17th, a fireman went ashore about 7 P.M., returned at 9 P.M., and at 4.30 A.M. the following morning, September 18th, was taken ill

with diarrhœa, slight vomiting, and cramps in the abdomen and limbs. He was attended by the ship's surgeon. Between 8 and 12 A.M. he had four large watery movements, and then the diarrhœa and vomiting ceased. He went into collapse, however, and died at 7.30 P.M. At the post-mortem examination, in addition to the lesions which were found in the other cases, there was a dilated heart, with fatty degeneration in the heart muscle and an adherent pericardium. A biological examination of the intestinal contents revealed the presence of the cholera spirillum.

CASE IX.—The same day (September 18th) a case was reported from New Brunswick, New Jersey, in which the patient was the captain of a canal boat, at the time lying off the foot of Thirtieth Street. This case was seen by Dr. Cyrus Edson at the request of the health authorities of New Brunswick, and some clothing soiled by the discharges was obtained for examination. The biological examination of this also revealed the presence of the spirillum of Asiatic cholera. It was not possible to determine definitely from the history whether the disease had been contracted in New York or outside, and as the death occurred in New Brunswick, it was not included in the cases occurring in New York City.

CASE X.—The same day (September 18th) a German, a coachman by occupation, resident in the United States seven years, but who had only returned to the city from Bay Shore, Long Island, on September 8th, was reported as ill with suspicious symptoms of cholera. It was said that he had been suffering from diarrhœa for several days, but had not been confined to his bed until the morning of the 18th. He had not been attended by a physician, and the case was reported to the Health Department by other occupants of the premises. A medical inspector found him suffering from diarrhœa, vomiting, cramps and pains in the abdomen, and severe prostration. He was immediately removed to the Reception Hospital, where he was treated until his death, on September 23d, at 6 A.M. During this time he had constant and profuse "rice-water" diarrhœa and vomiting, and severe cramps in the abdomen and legs. The temperature, which was subnormal before death, appeared to rise after death and the body remained warm for an unusual length of time. A post-mortem examination showed the same lesions as had been found in previous cases. The cholera spirillum was found in the intestinal discharges during life and in the intestinal contents after death. There was nothing in the history or associations of this man which were at all suggestive as to the manner of infection. This was the only case seen early enough to be removed before death, and caused the Health Department greater anxiety, perhaps, than any other single case, because it occurred in a large boarding-house of the poorer order, with 100 or 150 inmates.

CASE XI.—The next case was reported on September 29th. A German, marketman by occupation, was suddenly taken ill at 6 P.M. on September 28th, with watery diarrhœa, first brown-colored, and later of a rice-water character. There were severe cramps in the legs, but no pain in the abdomen, and but little vomiting. He died in a state of collapse on September 29th, at 2.30 A.M. At the autopsy the same lesions were found as were present in the other cases. There was nothing suggestive in the history or associations of this case as to the source of infection.

TABLE SHOWING DATA REGARDING THE CASES OF EPIDEMIC CHOLERA WHICH OCCURRED IN NEW YORK IN 1892.

No.	Date of illness.	Reported to Health Department.	Died	Sex.	Occupation	Remarks.
1	Sept. 5	Sept. 6	Sept. 7	M.	Laborer	
2	" 3 or 6	" 10	" 10	M.	Laborer in tripe factory	
3	" 10	" 11	" 11	F.	.....	Wife of Case No. 2.
4	" 10	" 11	" 11	F.	Infant	Child of Case No. 5.
5	" 12	.....	.....	M.	Laborer in slaughter-house	Recovered. Not examined biologically.
6	" 6	.....	.....	M.	Butcher	Recovered. Not examined biologically.
7	" 12	Sept. 13	Sept. 13	F.	....	Wife of Case No. 6.
8	" 18	" 18	" 18	M.	Fireman	"State of Nevada."
9	" 17	" 18	" 18	M.	Boatman	Died in New Brunswick.
10	" 18	" 19	" 23	M.	Coachman	Died in Reception Hospital.
11	" 28	" 29	" 29	M.	Marketman	

Dr. J. H. Huddleston, under the direction of Dr. Charles H. Roberts, Chief Inspector for Contagious Diseases, New York City Health Department, and the writer, made a very careful search in all the cases for the source of infection, but entirely without satisfactory results. Search was made in every case possible along the following lines:

a. Had any of the family been in Europe during the past six months, or did any of them know a person who had been there in that time?

b. Had any person or goods of unknown antecedents come to the house after July of this year?

(The answers to *a* and *b* were, with one exception—Case IV.—in the negative.)

c. What "calling acquaintances" had the family? Were these, as far as known, free from illness and from connection with infection?

d. Where did the members of the family take their meals? If not at home, did any suspicion attach to the place?

e. From what dealers were the food supplies for the house obtained? Where did those dealers buy their goods? (No investigation was made of water or milk supply.)

f. What occupations had the various members of the family?

g. If the occupation brought the person in contact with many others, were the latter, as far as known, healthy?

h. Could the work bring the person in contact with material which might be infected? If so, where did the material come from?

i. What were the habits of the family as to excesses, and as to cleanliness?

j. What theory of origin of the illness was held by the family?

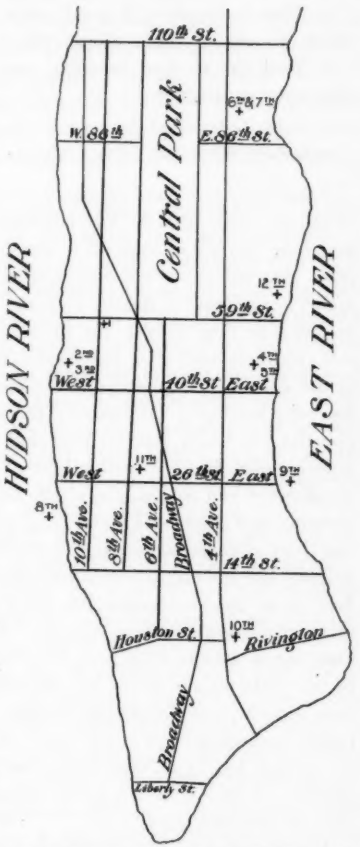
(Some referred the illness to a specified excess in eating or drinking; more had no theory. The majority insisted that the disease was not cholera.)

The quarantine of the houses enforced by the Board of Health had, in most cases, put the occupants in bad humor, and they were therefore not inclined to submit to a prolonged examination. In some cases answers known to be false were given, and in others some answers were probably false.

Such constant reference was made in the answers to food trades, and through them to a few slaughter-houses, that special inquiry was made at those places to learn whether the health of all the employés was satisfactory, and whether any were recently arrived immigrants, or had been in contact with such; but the health was reported good, and no clew was obtained.

A review was also made of the precautions taken against infection from the vessels under quarantine, with only the result of showing that the guards were probably sufficient.

An outline map of the city of New York is added, upon which are plotted the points at which the cases in this outbreak occurred, in order that an idea may be gained of the complete absence of topographical association.



Outline map of New York, showing topographical distribution of the cases of epidemic cholera.

Points marked + show where cases of cholera occurred, the numbers indicating the order of occurrence.

Case VIII.—Captain from canal boat, East 30th Street, died in New Brunswick.

Case IX.—Fireman on "State of Nevada," lying at foot of West 21st Street.

The high mortality in the recognized cases in the city and the lack of any association render two suppositions probable:

a. That a number of mild cases of epidemic cholera occurred in which the nature of the disease was not recognized.

b. That the cholera infection was in some way rather widely disseminated in the city.

APPEARANCES AND ANATOMICAL LESIONS FOUND POST-MORTEM.

Practically the same appearances and lesions were found after death in all the cases, nine in number, and these were so striking and characteristic, and are so unusual in autopsies in New York, that in the latter cases they seemed to the writer, in themselves, to be almost sufficient to justify a diagnosis of Asiatic cholera. The eyes and cheeks were deeply sunken, the face drawn, the extremities of the nose, ears, fingers, and toes shrunken and often cyanosed; the arms and legs were usually half-flexed, the hands clinched, and the toes drawn downward. Rigor mortis was very marked. On opening the abdomen the intestines presented a peculiar rosy blush, especially marked in the coils of the ileum. The small intestine was distended with slightly pink-colored contents resembling in appearance and consistence a thin broth. The mucous membrane of the stomach and of the small and large intestine was rather pale, and seemed but little changed excepting for the unusual prominence of the Peyer's patches and the solitary follicles in the ileum. The blood was completely fluid, or at most contained only a few soft, dark-colored clots, and seemed unusually thick and dark-colored. The lungs and all the parenchymatous organs appeared congested, and there seemed to be cloudy swelling in the heart muscle, liver, and kidneys. The spleen was rather smaller than normal, and the bladder empty. The brain and its meninges appeared congested. In a few cases the intestinal contents were not large in amount, but in all cases there was a striking absence in the intestinal contents of any biliary coloring matter or anything having the appearance of ordinary feces.

The appearance of the exterior of the body, the muscular contractions and cyanosis of the extremities, the rosy hue of the intestinal coils, the character and color of the intestinal contents, the appearance of the blood, and the absence of any anatomical lesions sufficient to cause death, form together a group of phenomena which seem almost characteristic of Asiatic cholera. However, it is probably impossible to say with certainty that cases presenting these appearances and anatomical findings are certainly Asiatic cholera, for, rarely, cases of so-called cholera morbus in the adult may present almost identical appearances and lesions.

The original biological examinations in all the cases were made by Dr.

Edward K. Dunham, of the Carnegie Laboratory. Before the official announcement of the cause of death in the first case, however, at my request, Dr. T. Mitchell Prudden examined the cultures and confirmed the diagnosis, and in several of the subsequent cases, before their announcement, the cultures were also examined by Dr. Prudden and Dr. H. P. Loomis. The identity of the organism found in these cases with the cholera spirillum has since been confirmed by several other well-known bacteriologists in this country, and by Dr. Petri, of the Imperial Board of Health of Germany.

It would hardly seem necessary to say anything regarding the importance of biological examinations to determine the cause of death in Asiatic cholera, were it not for some unfavorable criticisms that were made in regard to such examinations at the time, or that have been made since the outbreak. It would seem as if an argument to establish the necessity of such examinations in the beginning of an outbreak of Asiatic cholera was on a par with an argument to show the importance of the examination of the sputum in assisting the diagnosis of doubtful cases of pulmonary tuberculosis. So far as I am aware, in the absence of an epidemic or proof of infection, all physicians of experience are agreed that it is impossible to make, with certainty, a clinical diagnosis of Asiatic cholera, and it is also admitted that the first cases in an epidemic are always doubtful cases. I greatly question whether credence would or should be given to the statement of any physician or any number of physicians in asserting, upon the clinical history alone, that any given isolated case, occurring in the absence of any proof of infection of epidemic cholera, was a case of that disease.

The testimony of all the German observers in the recent epidemic in Germany has been that in many cases epidemic cholera occurs in such a mild form that no suspicion as to the nature of the disease would be aroused were it not for the biological examination; and, on the other hand, cases of cholera nostras are sometimes seen which present a perfectly typical clinical picture of epidemic cholera. Experience in these cases in New York, and in the cases which occurred at the quarantine station in 1887, convinces the writer of the enormous practical value of biological examinations for the diagnosis of Asiatic cholera, and it is certain that such examinations made by Dr. Prudden and the writer were alone the cause of the exclusion of epidemic cholera from New York in 1887, and that they were of the greatest importance in assisting the work of the Health Department in the outbreak this year.

In reviewing the history of this outbreak in New York, one is impressed by several interesting features:

First. In no single instance, after the most careful and conscientious inquiry and investigation, was it possible to find any satisfactory way of accounting for the infection.

Second. The cases occurred in widely separated parts of the city, and in no instance was there the slightest suspicion of association.

Third. After the cases were brought to the attention of the Health Department, in no instance did a secondary case occur.

Fourth. There was a striking association in the occupation of the persons affected with the food trades, and especially animal foods.

Fifth. Although some twenty-six suspicious cases were examined, in every one in which the cholera spirillum was found, eight in number, death occurred, while in only one of the other cases, in which the cholera spirillum was not found, did death follow. In two instances, however, where recovery took place—that is, the fifth and sixth cases—although biological examinations were not made, the associations with cases which were proven to be cholera Asiatica justified the assumption that these were of the same nature.

THE BACTERIOLOGICAL EXAMINATION OF THE RECENT CASES OF EPIDEMIC CHOLERA IN THE CITY OF NEW YORK.

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The materials submitted for bacteriological examination differed considerably in character. As most of the suspected cases died after a very short illness, material could first be collected only at the autopsy. Some of the intestinal contents, and in one case some of the contents of the stomach, were collected in vessels for transmission to the laboratory, or the ileum was tied at two points a short distance apart and then cut beyond the ligatures so that there might be the least possible alteration of the contents before its actual examination. In two cases fluid dejecta were obtained from suspected cases during life and sent to the laboratory in stoppered bottles. In still other cases the only available material before the death of the individual was clothing soiled by dejecta.

The method of examination necessarily differed according to the nature of the material received for examination. Where this material was fluid it was examined directly under the microscope, without previous staining, and again after drying and dyeing with aniline colors.

These direct microscopical examinations of the intestinal contents proved very unsatisfactory. In only one case did cover-glass preparations of the dejecta show large numbers of comma bacilli agreeing in form and size with the cholera bacillus. This case was where dejecta

had been collected from a patient some time before death and examined within a very few hours. Plate cultures from the same material showed that the cholera bacillus made up 98 per cent. of those bacteria present which were capable of developing in ordinary nutrient gelatin at the temperature of the room.

In all the other cases microscopical examination revealed an abundance of columnar epithelium from the intestinal mucous membrane; numerous straight, thick bacilli; a considerable amount of granular detritus; but at most only a few curved bacilli, which could not warrant even a presumption for or against the probability of a diagnosis of epidemic cholera. Plate cultures from this same material revealed the presence of the cholera bacillus in proportions varying from about 20 per cent. to as high as 90 per cent. of the total bacteria developing upon the plates. This observation shows the importance of not relying upon a simple microscopical examination of dejecta or intestinal contents. An analogy is presented by the untypical forms found in old bouillon and gelatin cultures of the cholera bacillus.

The cultures made for the purpose of identifying the cholera bacillus were invariably prepared by inoculation from typical colonies upon plate cultures. These plate cultures were made, where possible, directly from the fresh dejecta, or from material taken from the intestine or stomach at the autopsy. Where this was impossible, the material sent for examination (soiled clothing, etc.) was introduced into bouillon in test-tubes, and the latter placed in an incubator at 36° C. (96.8° F.) for six, eight, or twelve hours, until the bouillon was cloudy. From these impure bouillon cultures the initial plate cultures were then made, and the colonies developing on these plates used to inoculate other media for the purpose of identification.

In order not to miss the cholera bacillus, should it be present in small proportion, even where dejecta or intestinal contents were received, this preliminary bouillon cultivation was made in the hope that in this way material for plate cultures, more favorable than the original material, might be obtained. This safeguard against possible failure to detect the cholera bacillus in the original material proved unnecessary in all the cases examined. The first set of plates from the original dejecta always yielded positive results, there being no difficulty in detecting the colonies of cholera bacilli. A previous cultivation in bouillon at the body temperature appeared, however, to increase somewhat the relative abundance of the cholera colonies upon the plates. In the cases where the material to be examined was very small in amount and dried upon clothing, a preliminary cultivation in bouillon proved very satisfactory.

The bacteria associated with the cholera bacillus were chiefly bacterium coli commune or proteus vulgaris, so that there was no difficulty in distinguishing those presumably cholera from those which were certainly

not cholera. But the appearances of the cholera colony varied so much on plates which developed at different temperatures, and with the size of the diaphragm used when they were examined under the microscope, that it seems excusable to dwell a little upon these variations, since the recognition of the cholera colony is the first step in the bacteriological diagnosis of a case.

The classical descriptions of the cholera colony refer to colonies which have developed at a temperature of from 60° to 65° F. Under these conditions the colony appears circular, coarsely granular, with a peculiar high refraction, giving an appearance as though the colony were made up of broken bits of glass or beads of various sizes grouped together. It is colorless, or sometimes has a very faint pinkish tinge when examined with some lenses, but not, as far as I have observed, when examined with apochromatic objectives. Around the colony, after it has reached a considerable size (thirty-six to forty-eight hours), there is a narrow zone, in which the gelatin is softened and its surface depressed. This causes a refraction of the light, so that the colony appears surrounded by a shadow when a moderately small diaphragm is used.[1]

This description of the colony applies only to colonies more than twenty-four hours old. Very young colonies appear as minute, fine granular, colorless spots; nearly circular, but with a slightly irregular edge.

Colonies which have developed at a higher temperature, approaching the point at which the gelatin begins to soften (from 70° to 73° F.), show considerable modifications attributable to the more rapid liquefaction of the gelatin. Instead of forming a compact mass surrounded by only a narrow zone of softening, the growth appears more or less scattered through a circular area of liquefaction. There is a central, more compact mass, resembling the colony grown at a lower temperature; but its edge is ragged, and in the liquid surrounding it there are small, irregular portions of the growth which appear to have been detached from the central mass, and to float about freely in the liquid. The edge of the liquefaction, when a very small diaphragm is used, shows a narrow border of growth, with very fine short radiations resembling the milled edge of a coin, but never extending appreciably into the solid gelatin.

The appearances described are illustrated in Figs. 1 to 4.

As soon as the colonies upon the plate cultures had grown enough to develop their characteristic appearances, material from them was used

[1] The Abbé condenser with iris diaphragm was used when the plates were examined, and the size of the diaphragm varied to bring out the structure of the colonies. The smallest aperture was about one millimetre.

to inoculate tubes containing about two cubic centimetres of a sterile solution of 1 per cent. peptone and ½ per cent. table salt in distilled water. These peptone cultures were then placed in the incubator at about 36° C. (96.8° F.) for six hours. They were then examined in hanging-drop preparations to determine the form, arrangement, and motility of the individual bacteria. In all of the cases these hanging drops showed curved bacilli, either isolated or in S-shaped pairs, and possessed of a very active motility. The growth was sufficiently abundant to render the liquid distinctly cloudy, and to occasion a whirling appearance in the cloudiness when the tube was shaken. These tubes were then used to obtain the "indol reaction" by pouring a few drops of concentrated, "strictly pure" sulphuric acid down the inner surface of the tube, so that a layer of the strong acid was formed below the cultures. Within a few moments the peptone solution acquired a distinct rose tint, sometimes tending toward lilac. In such young cultures the color was often faint, but in all cases it was unmistakable. The peptone used was Witte's "peptonum siccum."

These observations required from thirty-six to forty-eight hours from the time the material was received, and if all the data furnished by them agreed with the known characteristics of the cholera bacillus, a positive report was considered as justified. These data were: 1. The size, form, and arrangement of the individual bacilli. 2. Their motility. 3. The appearance of colonies upon plate cultures. 4. The comparatively slow liquefaction of 10 per cent. slightly alkaline nutrient gelatin. 5. The rapid development in peptone solution at the body temperature. 6. An early and distinct development of a positive response to the "indol test."

Fortunately, in all the cases examined, the variations in the above characteristics fell within the limits of variation previously well recognized in studies of fresh, pure cultures of the cholera bacillus grown at various temperatures. There was, therefore, no ground for hesitation in arriving at a diagnosis.[1]

As confirmatory tests, cultures in gelatin tubes, on agar-agar, and on potato were also made.

The gelatin-tube cultures show variations in development perfectly analogous to those observed in the colonies upon plate cultures, and due

[1] In further confirmation of my identification of the cholera bacillus in cultures from the recent cases in New York, I have received communications from Dr. Harold C. Ernst, of Harvard University Medical School, and from Dr. Petri, of the Imperial Board of Health in Berlin, stating that the cultures which I had the pleasure of sending them from the first case (McAvoy), and which they very kindly studied, were, in their opinion, characteristic of cholera. Dr. Petri further stated that after comparing my culture with recent cultures from cases in Hamburg and in Berlin for two weeks, he could detect *no difference* between them. I wish here to express my thanks to these gentlemen for their kindness in this matter.

also to differences of temperature. These variations are of degree rather than of kind, and are illustrated in the accompanying photographs.

Not only do the appearances of cultures differ where the development has taken place under different conditions, but the appearances of the individual bacilli vary somewhat according to the medium and the temperature. Under some circumstances the bacilli appear short and but slightly curved. In other cases they are longer, appear more slender, and show a much more marked curvature. These observations are illustrated by the photographs. Fig. 10 was taken of a contact cover-glass preparation made from a plate culture after development for forty hours at a rather high temperature (between 65° and 70° F.). Fig. 11 is a photograph of a cover-glass preparation made from a culture in peptone solution. Fig. 12 is a photograph from a cover-glass preparation made by contact from a plate culture grown at a low temperature. It is very exceptional to find spirilla in colonies developed upon gelatin plates. In bouillon cultures of cholera from the first case (McAvoy), spirilla of twenty-five turns were observed.

The following is a brief summary of the results obtained in the individual cases which yielded positive results:

Sample 1 [Case I.; McAvoy.]—Intestinal contents obtained from the ileum more than twenty-four hours after death. Cholera bacilli found in the proportion of about 30 per cent. of all the bacteria growing upon plate cultures.

Sample 2 [Case IV.].—Dejecta. Cholera bacilli found in great abundance. Percentage not determined.

Sample 3 [Case III.].—Dejecta. Examination within a few hours of collection. 98 per cent. cholera bacilli.

Sample 4 [Case VII.].—Intestinal contents received in a portion of colon tied at both ends, more than twenty-four hours after death. Cholera bacilli abundant. No record of percentage.

Sample 5 [Case IX.].—Two samples: 1. Rag soiled with dejecta. 2. Cotton wad soaked in a mixture of dejecta and vomitus which had been very largely diluted with water by the family of the patient. Cholera found in abundance in both samples. Percentage estimation impossible. Large quantities of proteus vulgaris contaminated the plate cultures.

Sample 6 [Case VIII.].—Intestinal contents. Cholera bacilli in great abundance. No record of percentage.

Sample 7 [Case X.].—Dejecta on clothing and on wad of absorbent cotton. Cholera bacilli in great abundance. Percentage determination impossible.

Sample 8 [Case XI.].—Dejecta examined four hours after their collection. 32 per cent. cholera. Intestinal contents examined within twelve hours after death. 88 per cent. cholera.

Sample 9.—Intestinal contents examined about twenty-four hours after death. 85 per cent. cholera. The gastric contents contained 70 per cent. of cholera.

In every case the examination was made in duplicate; in most of the cases in triplicate or quadruplicate.

Fig 1. Fig. 2. Fig. 3. Fig. 4.

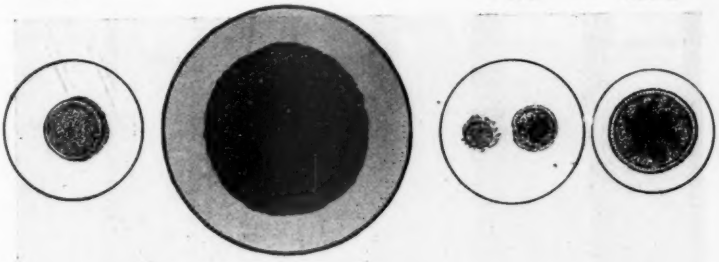

Fig. 5.

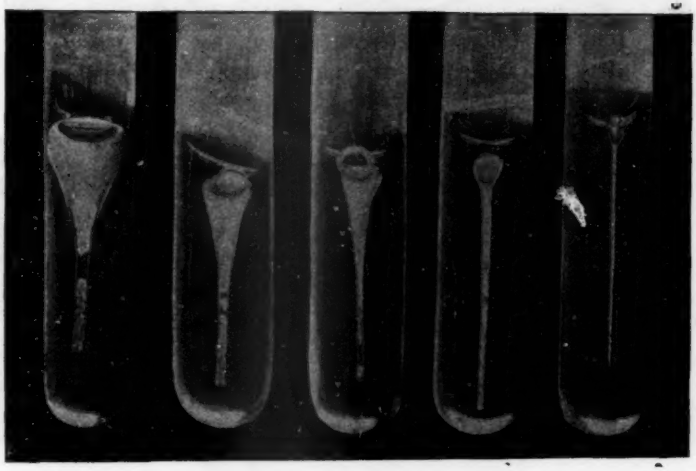

Fig. 6.

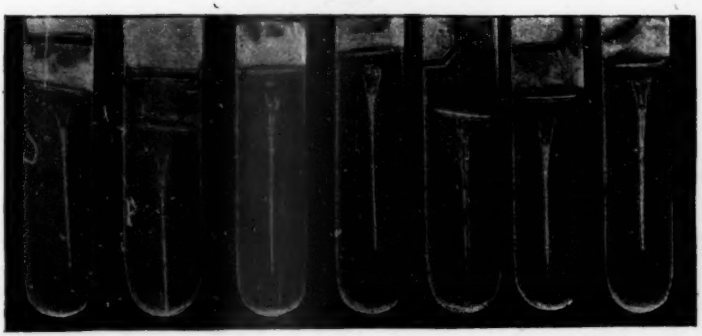

Fig. 7.

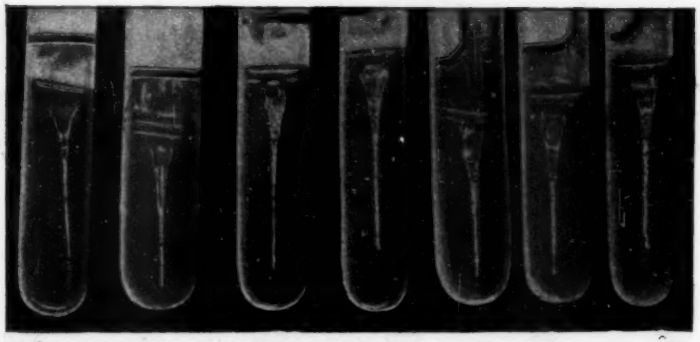

Fig. 8.

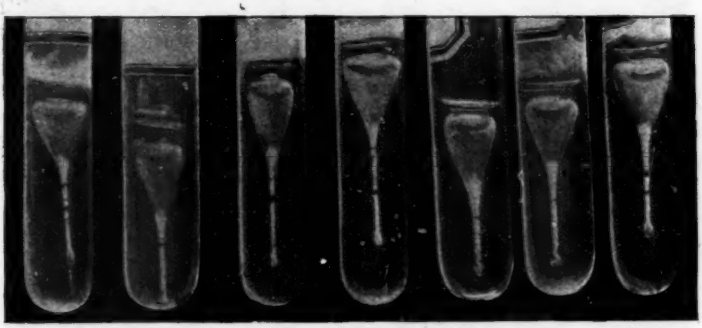

Fig. 9.

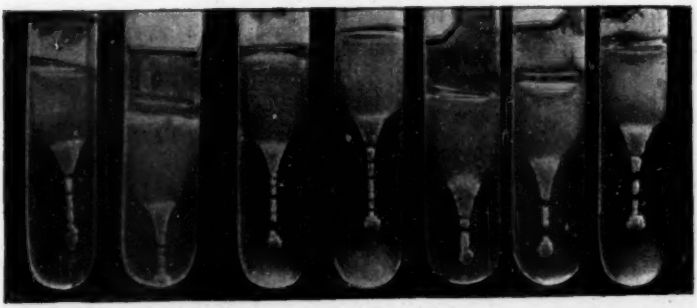

Fig. 10.

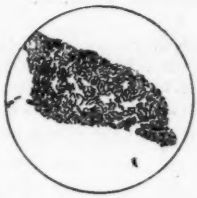

Fig. 11.

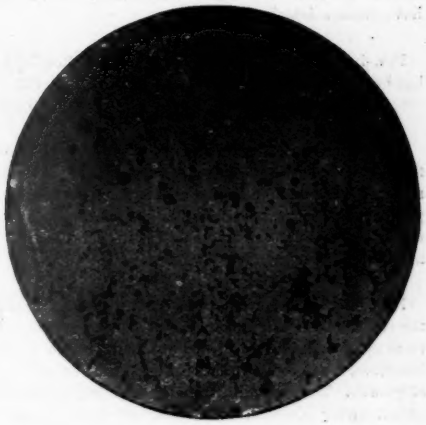

Fig. 12.

Explanation of the Illustrations.

Fig. 1. Colony of cholera bacilli on a plate culture forty hours after its preparation. Photographed with Abbé condenser and small diaphragm. The refraction of the light by the depressed surface of the softened gelatin around the colony is perceptible. Amplification about 40 diameters. Culture obtained from intestinal contents of the first case.

Fig. 2. Colony of cholera bacilli on a plate culture two days old. Magnified about 75 diameters. Small diaphragm.

FIG. 3. Two colonies of cholera bacilli on a plate culture forty hours old. One of the colonies shows an extension of the liquefaction for a short distance beyond the central mass of growth. The edge of the central mass is ragged, and portions of the growth have become detached.

FIG. 4. Cholera colony on a plate culture after liquefaction of the gelatin had begun, but had not extended beyond the colony of bacilli. Photographed with a very small diaphragm. The edge of the colony shows the milled effect described in the text.

FIG. 5. Gelatin-tube cultures of cholera from the first case (McAvoy), one, two, three, four, and six days old. Temperature during development about 70° F. The culture medium was prepared from a cold aqueous extract of lean beef, to which 1 per cent of peptone, ½ per cent. of salt, and 10 per cent. of gelatin had been added, according to the methods usual in the Hygienic Institute in Berlin. The reaction of the gelatin was faintly alkaline.

FIGS. 6, 7, 8, and 9 are parallel gelatin-tube cultures from the first seven cases in which the cholera bacillus was found. They were inoculated at the same time from pure cultures upon agar, and developed at a temperature ranging between 50° and 60° F. They illustrate, when compared with Fig. 5, the influence of temperature upon the rapidity of growth. They also illustrate the identical appearance of cultures of the same bacillus grown under identical conditions, but derived from different sources. These photographs were taken after three, five, nine, and fifteen days' development.

FIG. 10. Contact cover-glass preparation from a plate culture of cholera after forty hours' development. Magnified about 700 diameters.

FIG. 11. Cover-glass preparation from a culture of cholera in peptone solution, developed for twelve hours at a temperature of 36° C. (96.8° F.). Magnified 700 diameters.

FIG. 12. Contact cover-glass preparation from a plate culture developed at a low temperature. Amplification about 700 diameters.

REVIEWS.

THE ESSENTIALS OF HISTOLOGY. By E. A. SCHÄFER, F.R.S. Third edition, revised and enlarged. Illustrated. Philadelphia: Lea Brothers & Co., 1892.

THE appearance of three editions within but little over twice that number of years, argues well for the usefulness and popularity of any book; such evidence of success the little volume under consideration has won. The revision by Professor Schäfer of the histological portions of Quain's *Anatomy* for the new tenth edition, in course of preparation, has afforded the opportunity of incorporating in the *Essentials* additional illustrations, as well as such changes in the text as the author has deemed desirable. Containing, as it does, the most useful histological figures of Quain, as well as others from varied sources, the book brings within the reach of everyone a most valuable collection of drawings; the additions to the present edition have still further emphasized this feature, and it is safe to say that nowhere else will the same very moderate outlay secure as thoroughly useful and interesting an atlas of structural anatomy as that presented in this volume.

While the former general plan of the book has been retained, almost every chapter—or "lesson," as here termed—has been supplemented by new cuts.

A number of additional illustrations from several recognized authorities materially facilitate the student's comprehension of the newer accepted views regarding the structure of protoplasm and the complicated karyomitotic cycle accompanying cell-division. The sections devoted to the brain and spinal cord are greatly improved by the new figures taken from preparations made by approved present methods. The results of the recent elaborate investigations concerning the minute anatomy of the great nervous centres, following the introduction of the new silver stainings by Golgi, Ramón y Cajal, Kölliker, and others, have received recognition, some of the most instructive pictures of tissues so treated finding their place among the older figures.

The chapter discussing voluntary muscle presents the author's more recent conclusions regarding the difficult, and still unsettled, problem of the ultimate structure of striated muscular tissue. With Rollett and Kölliker, the author recognizes two substances within the sarcolemma of the muscle fibre—the darker, doubly-refracting, contractile substance, arranged as longitudinal threads, the muscle columns (Kölliker) or *sarcostyles* (Schäfer), and the lighter, less active, and non-contractile *sarcoplasm*. The sarcostyles are regarded as being themselves composed of longitudinal series of segments, the *sarcomeres*. These latter are made up of sarcous substance, and are pierced by minute, short tubular canals, extending from the clear zone at either end of the sarcomere toward the middle of the disk. Schäfer concludes that the well-known phenomena

of contraction—the approximation of the dark bands and the increase in the width of the sarcous elements—really depend upon the partial entrance into or extrusion from the minute canals or pores, by which the apparent amount of the clear, non-contractile substance diminishes or increases. While basing his views on a study of the wing muscles of insects, Prof. Schäfer is convinced that the arrangements there found are directly applicable to the vertebrate muscle.

The Appendix is supplemented in the present edition by the introduction of several of the more recent methods. It is curious to note, in connection with interstitial paraffin imbedding, the retention of the misleading sentence directing that the paraffin should be "dissolved out by turpentine or xylol and the sections mounted." That the author appreciates the necessity of first fixing delicate sections to the slide before the supporting paraffin is removed goes without saying; the less fortunate tyro, however, following the letter of the text, would probably wonder wherein lay the value of the paraffin method, if the beautiful sections it yields are but to be subsequently reduced to hopeless fragments by premature removal of the supporting imbedding mass.

The author's choice in favor of the Cambridge rocking microtome for ribbon-series, on the one hand, and the Thoma instrument for ordinary cutting on the other, will be challenged. Anyone who has had the opportunity of comparing, by actual use, the relative merits of the Cambridge instrument with the automatic microtome of Minot can scarcely fail to prefer the latter for serial work, while, as an all-round section instrument, the microtome of Schanze stands unrivalled.

While recognizing fully the author's acknowledged purpose to omit "unimportant details," yet we confess to a sense of disappointment in the meagre description of many organs, even when elaborately illustrated. Experience warrants the belief that a somewhat fuller presentation of the structure and relations of not a few of the parts considered would aid, rather than confuse, the student in acquiring the *essentials* of the subject.

With the additional merits that the present edition possesses, the continued success of the work as a concise text-book, containing the rudiments of histology, is well assured. G. A. P.

TEMPERAMENT, DISEASE, AND HEALTH. By FRENCH ENSOR CHADWICK, Commander U. S. N. 8vo., pp. 85. New York: G. P. Putnam's Sons.

ALL books that have for their chief object the exposition to the general public of the importance of hygiene and preventive medicine are of distinct good; their actual value depending largely, of course, on the clearness and simplicity with which the scientific facts are set forth.

In *Temperament, Disease, and Health*, the author has gathered together the opinions of modern scientists regarding the part which microörganisms play in the causation of disease, and has added some theories of his own in respect to temperament, as well as a chapter on Health, in which some useful information is given regarding the hygiene of everyday life.

On the whole, this little work, while rather too technical for the general public, will be of value to a certain class of non-medical persons.

F. W.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.A., M.D., LL.D.,

PROFESSOR OF CLINICAL MEDICINE AT THE NEW YORK POST-GRADUATE MEDICAL SCHOOL AND HOSPITAL; ASSISTANT VISITING PHYSICIAN TO BELLEVUE HOSPITAL.

The Use of Strychnine and Digitalis in Diarrhœa.

Mr. Harold Hendley notices that, in fevers of a remittent character, the complication of persistent diarrhœa occurred frequently, and at periods when the patient was worn out by fever and the digestive powers were rapidly failing, determined to use these drugs to combat certain symptoms. In these cases the temperature ranges from 1° to 2½° above normal, the pulse is soft and yielding, not very rapid, and markedly wanting in tone; the motions, four or five daily, increase in number until nourishment appears to excite an action of the bowels, marked by even a greater tendency to fluidity, the extreme being reached when the motions escaped involuntarily, and is followed by a tendency to cardiac failure, if not collapse, frequently accompanied by a consciousness of approaching dissolution in the patient. Digitalis was chosen for these cases because of its well-known general action upon the vasomotor system, strychnine for its less-known more direct action upon that portion of the system concerned in the control of the blood supply to the intestines. The mixture employed was tr. digitalis, ♏iv; liq. strychniæ, ♏ij; spts. chloroformi, ♏v; in water, and repeated at from one to four hourly intervals.—*The Practitioner*, 1892, No. 290, p. 92.

The Treatment of Certain Rebellious Hemorrhages by Counter-irritation over the Splenic or Hepatic Area.

Dr. L.-H. Pettit, calling attention to the close relationship which exists between spontaneous hemorrhages and chronic diseases of the liver, regards the logical treatment of this symptom to be the application of counter-irritation over that organ. *En résumé*: in the event of an abundant spontaneous hemorrhage, or if it is repeated, it is necessary to examine with care the con-

dition of the liver, spleen, and kidneys, and if these organs are diseased it is indicated, at least as far as the liver or spleen is concerned, to apply a cutaneous revulsive more or less energetically in these regions—either blisters or the actual cautery. A milk diet is indicated in the case of nephritis. Perhaps it is advisable that we should also employ digitalis in hemorrhages due to cardiac disease. The intensity of the necessary revulsion varies according to circumstances; in some cases vesication for an hour is sufficient, in others energetic and repeated applications are necessary.—*L' Union Médicale*, 1892, No. 106, p. 361.

Mechanical Treatment of Chronic Rheumatism.

Dr. C. O. Walbridge recommends mechanical means, including calisthenics, with its healthful exercise of body and limbs, to break up existing adhesions, to smooth the roughened articular cartilages, strengthen the contracted tendons and nerve tissues, and restore the joint to its former suppleness—first, by a process of stroking and kneading in a centripetal direction, stimulating the lymphatics and venous currents and surrounding tissues to greater activity, carrying the lymph with greater rapidity toward the centre. By these means the lymphatics and circulating system are stimulated, setting up changes in the nutrition, causing healthy activity in the parts. In cases where there is perceptible defective nutrition, constitutional remedies with dietetic medication must be employed. The primary effects are upon the joints, muscles, and nerves. In the joints stiffness, adhesions, and contracted tendons are broken up and got into a proper condition for absorption. The secondary effects are produced upon the circulation and lymphatic system. The muscles and nerves are surely elongated, heat must necessarily be evolved by the manipulations changing the molecules of the muscles from an inactive to an active state, causing internal work, setting up molecular changes in all of the surrounding tissues. The waste material is carried away by increased action of the lymph and circulation, and new nourishment is more readily carried to all parts, feeding them and enlivening the whole organism.—*The Dietetic Gazette*, 1892, No. 9. p. 122.

Euphorine.

Dr. H. Köster has very carefully studied this remedy, now in use for about two years, and otherwise known as phenyl-urethane. It is used as an antipyretic and antiseptic, but more especially for rheumatism and neuralgia, in eight-grain doses in the form of powder given thrice daily. It does not influence the pulse or respiration, although slight cyanosis has been noticed, and marked symptoms of collapse (one case) have been observed. The remedy is acceptable to the stomach; it produces no subjective symptoms, with the exception of a few cases noted by Sansoni, where a feeling of warmth was experienced; it does not produce any reddening of the skin. He has used this remedy in ninety cases, the temperature being taken in the rectum. In estimating its value as an antipyretic in forty-two cases of different diseases (tonsillitis, acute pneumonia, typhoid fever, influenza, endocarditis, tuberculosis), it can be stated that it is a powerful and practicable antipyretic, but somewhat capricious in its action, at times producing marked effects, and

at others, in the same patient, by no means having a similar effect, and that without any satisfactory reason being apparent. After using this remedy in twenty cases of headache, it is evident that it cannot compare with other more usually employed remedies, but may succeed where they have failed. Eleven cases of sciatica were treated without any noticeable, or absolutely without any, result. In fourteen cases of acute articular and seven of muscular rheumatism the results were that the temperature was speedily reduced, leaving the patient without fever after four or five days; the pains were usually lessened, in several cases completely removed, but the treatment was of longer duration than with the salicylates. Yet in some cases the effusion and sensitiveness of the joints disappeared, while the slight remaining pain necessitated the use of the last-mentioned remedies. On the whole, in muscular rheumatism the results were so unsatisfactory that other remedies must be resorted to.—*Therapeutische Monatshefte*, 1892, Heft 8, S. 397.

The Anatomical Changes in Poisoning by Sublimate.

Dr. Andrea Calantoni presents a very thoroughly scientific and carefully prepared paper, based upon the literature and upon experiments in the laboratory, from which he deduces the following conclusions: The sublimate penetrating into the blood is eliminated by the kidneys (in a large part) and by the intestine, giving rise, in these organs, to changes of a necrotic nature. In the kidneys, a single large dose being followed by death in a few hours, no changes, save small hemorrhages in the inter-cellular tissues, are found. If life is prolonged from five to ten hours there is found cloudy swelling of the protoplasm; if still longer, epithelial necrosis is clearly shown. In some cases of subacute poisoning there is found a deposition of lime, but differing from the calcareous metastasis of Virchow, in that it is a calcification of single elements and not a secretion of lime from acute decalcification of bone or modification of diffusive power of the renal filter. In the intestine the alterations are chiefly found in the large intestine, and consist of hyperæmia, hemorrhage, and necrosis at the summit of the folds, presenting all the characteristics of a diphtheritic process. There is apparently no relation between the severity of the renal and intestinal lesions. The results of necropsy do not furnish a sure, but only a probable anatomical diagnosis.—*Giornale della Associazione Napolitana di Medici e Naturalisti*, 1892, Puntata i, p. 1.

The Treatment of Tubercular Adenitis by the Method of Lannelongue.

Dr. Moncorvo reports a case in which a glandular tumor of tubercular origin, seated in the left submaxillary region, was cured by the injection of four drops of a 5 per cent. aqueous solution of chloride of zinc into the periphery of the tumor. This injection was repeated at varying periods of three to five days, one intermission of six days being necessitated by pain and local reaction. On resuming, two injections of three drops each were made at fortnightly intervals, when local treatment ceased, about two months having elapsed. Four months later examination showed only three small glands, hard to the touch and insensitive to pressure. The general condition of the patient had markedly improved.—*Nouveaux Remèdes*, 1892, No. 15, p. 347.

The Value of Quinine in Malarial Hæmaturia.

Prof. H. A. Hare, in a very scholarly paper, concludes that in the milder forms of the disease quinine should not be employed during the hæmaturia, nor in those cases in which idiosyncrasies exist. In cases which are malignant in their manifestations in other lines than the mere hæmaturia, and depend upon a malarial paroxysm superimposed upon a malarial dyscrasia, then quinine is needed; but in the hæmaturia following prolonged subacute or chronic malarial poisoning, it is not to be given in full doses, but only as a tonic, the physician relying upon change of climate, nutritive foods, tonics, and other drugs to renovate the patient's tissues.—*Therapeutic Gazette*, 1892, No. 7, p. 448.

The Intra-venous Transfusion of Artificial Serum in Cholera Patients.

Dr. L. Galliard has employed this method in the treatment of 150 cases, making use of the internal saphenous vein. The formula is: sterilized distilled water 1000, pure chloride of soda 5, sulphate of soda 10, at the temperature of the body, the injection for adults being two quarts. The reason for this treatment is simply to gain time, and aid by these injections the action of remedies. It is not contra-indicated—1, in dry cholera; 2, slow progress of the disease; 3, subnormal rectal temperature; 4, febrile conditions; 5, advanced age of the patient; 6, pregnancy, alcoholism, tuberculosis, cancer, or cardiac affections, although these militate against the success of the operation. The percentage of cures is over fifty. When transfusion was practised *in extremis* one out of six cases has been saved.—*Gazette hebd. de Médecine et de Chirurgie*, 1892, No. 41, p. 481.

Asaprol.

M. Auguste Bompard has made a very thorough study of this new aspirant for therapeutic favor. Asaprol was so named by Dujardin-Beaumetz (*ἀ*, privative, and *σαπρὸς*, putrid), from its properties as a general antiseptic. It is a derivative of β-naphthol (β-naphthol: α-mono-sulphonate of calcium), and has the formula $C_{10}H_6 \begin{cases} \alpha SO_3H \\ \beta OH \end{cases}$, in the condition of a lime salt, and occurs as a whitish, odorless, bitter powder; soluble in three parts of distilled water, and in alcohol less soluble. About one-half of the amount ingested is eliminated in the urine; more, however, being thus eliminated if administered in *cachets*. As an antiseptic, in 2 per cent. solution, it retards the development of the bacilli of Asiatic cholera, herpes tonsurans, and typhoid fever; a three per cent. solution completely arrested the two former, and markedly retarded the growth of the bacilli of typhoid, bacillus pyocyaneus, staphylococcus aureus, and of the bacteria of anthrax. As an antipyretic the effect is manifest, rapid, and persistent; in addition, it possesses marked analgesic properties. In the experience of Stackler it was a better antipyretic and analgesic in influenza than antipyrine and quinine, administered consecutively or combined. It is of especial value in acute articular rheumatism, in daily dosage of from fifteen to sixty grains, administered in *cachets*, requiring but two days to demonstrate a marked amelioration of the symptoms. In this relation the

excellent results are explained by the generally accepted theory of the microbian origin of acute articular rheumatism, where a general antiseptic, like the one under consideration, can be administered in sufficient doses without harm to the patient. Here its action is quite as rapid as that of the salicylates, and relief is well marked, usually upon the second day, and becomes constantly more marked, and, on the average, cure results in eight days. It is even more certain than the salicylates, no failures being recorded, while in about 22 per cent. of the cases in which the salicylates are employed failures occur. Nor indeed does it, as the salicylates, give rise to nausea or vomiting. Although its taste is bitter, it is not nauseating, nor does it produce vomiting; and, too, the auditory disturbances and the cerebral congestions (of old age) are absent. It is efficient in less than one-half the dose of the salicylates. In fine, it yields in no respect to them, and in certain cases it is superior in that it presents none of their inconveniences. On the other hand, while acute articular rheumatism is of infectious origin, the chronic is undoubtedly the result of a disturbance of nutrition; therefore, in the latter case, we expect to obtain no result other than a temporary analgesic one—and that, indeed, not always. The method of administration is important, the normal dose being sixty grains; rather less than double this quantity if administered by the rectum. The first day the dose should be thirty grains, the next forty-five, and the succeeding days the full amount of sixty grains is needed; which can, if necessary, be continued for several weeks, finally terminating the treatment by gradually diminishing the daily amount. It is better to give small doses at frequent intervals, so that the organism may be kept continuously under the influence of the drug. It can be given in distilled water (a 5 per cent. solution), or in syrup and anise-seed water, or in *cachets*, or as an excellent gargle, in mulberry syrup and in infusion of blackberry leaves. Being a lime salt it is naturally incompatible with all salts which precipitate lime, notably the soluble sulphates and bicarbonate of soda. Iodide of potassium is absolutely incompatible with it. He concludes: 1. It is a soluble body. 2. It is a good general antiseptic. 3. It is a good antipyretic. 4. It possesses analgesic properties. 5. It is a remedy of choice in acute articular rheumatism. 6. It favorably modifies the anginas; it modifies the infectious condition in pneumonia.—*Thèse, Faculté de Médecine de Paris*, 1892.

Trional as an Hypnotic.

Dr. A. Boettiger has used this remedy, otherwise known as diethylsuphon methylethylmenthan, in about seventy-five cases in which insomnia has been a prominent symptom. The doses vary from fifteen to sixty grains, administered as a powder in warm water, milk, soup, or tea, in two or three doses, the last being at bedtime. In simple insomnia, sleep follows generally within an hour and lasts six to nine hours. It is apparently as effective in one-third the dose as chloralamide or amylene hydrate. In insomnia the sequence of bodily pain, the conclusion is that the pain itself is not influenced. Among insane patients, mildly affected, trional is a serviceable hypnotic; in more severe cases, in larger dosage—that is, from frequent repetitions—it is often valuable. Apparently patients do not become habituated from continued usage.—*Berliner klinische Wochenschrift*, 1892, No. 42, S. 1045.

Salophen.

Dr. Caminer, from his observations of the use of this remedy, has not found that it disarranged digestion, but that only in the intestine is it decomposed into its constituents, salicylic acid and acetylparamidophenol. He administers it in fifteen-grain doses, every two hours, up to the daily amount of ninety grains, in acute articular rheumatism. It produces marked results upon pain, redness, and swelling, so that within six to ten days the patient is entirely free from pain, nor has he observed any relapses. As acetylparamidophenol is a decomposition-product of phenacetine, to which with probability may be ascribed its analgesic properties, we may expect that this compound will relieve pain more markedly than either salicylic acid or phenacetine alone. He records its successful use in habitual headaches, trigeminal neuralgias, and failure in sciatica (one case). In hemicrania, relief follows its administration during the attack, but the intervals are not lessened. He reports no toxic effects in the cases under observation.—*Therapeutische Monatshefte*, 1892, Heft 10, S. 519.

Losophan.

Dr. Edmund Saalfeld reports that this new aspirant for recognition among the iodine preparations has the formula $C_6HI_3.CH_2.OH$, occurring in white needles, soluble with some difficulty in alcohol, but easily in ether, benzol, and chloroform; it contains about 80 per cent. of iodine. It has been used in a 2 per cent. solution in equal parts of alcohol and water, but on account of precipitation a 1 per cent. solution is preferable, together with a larger percentage of alcohol (to 75 per cent.). The reported cases include those of mycosis tonsurans, herpes tonsurans, sycosis parasitaria, and pityriasis versicolor. In eczema it has been used as a 1 or 2 per cent. ointment of vaseline or of lanolin to which 20 per cent of vaseline is added. He has found it of use in most of the mycoses, in prurigo, and in chronic infiltrated eczema, sycosis vulgaris, acne vulgaris, and rosacea. It is of less use as an anti-pruritic in urticaria, and without result in psoriasis vulgaris and primary syphilitic affections. In the form of a dusting-powder it does not markedly affect secretion and is of secondary value as compared with other commonly used remedies. It is contra-indicated in all acute inflammatory cutaneous diseases, which are irritated by it even in weak solutions.—*Therapeutische Monatshefte*, 1892, Heft 10, S. 544.

The Harmlessness of Dermatol.

Dr. E. Glaeser reports an instance in which a liberal use of subgallate of bismuth in powder form with flushings of a 1 per cent. sublimate solution was followed by death, the patient having received extensive burns from the explosion of a kerosene lamp. By means of the alkaline secretion from the wounds the dermatol is broken up into gallic acid, hitherto shown by Heinz to be absolutely innocuous, and into oxide of bismuth. In this case the bismuth or the mercury must have been at fault, and taking into consideration the results of the necropsy, he believes that this death could be justly attributed to the sublimate. However, the fact that bismuth may give rise to toxic

symptoms, as has been pointed out by Kocher and Petersen, should be borne in mind.—*Berliner klinische Wochenschrift*, 1892, No. 41, S. 1024.

[The author calls attention to the fact, quoting Langhaus, that in bismuth poisoning the same calcareous changes are found in the kidneys as in sublimate intoxication.—R. W. W.]

The Treatment of Cholera in the Altona Hospital.

Dr. Du Mesnil has had under his observation about five hundred cases during the last epidemic. To destroy the bacteria *in situ* he administers calomel in seven-grain doses twice in the course of two hours, following with grain doses every second hour, believing this to be of more value than salol, creolin, or other cresol preparations. Further antisepsis he obtains with Cantani's tannin injection (10 : 2000). To meet the indication presented by the abstraction of water from the tissues and thickening of the blood and the resultant symptoms, he employs the sodium chloride infusion injected into the veins. He stimulates the heart, when it is required, with camphor, makes use of baths, 90° to 96° F., and relieves vomiting and muscular cramps in legs by morphine. The mortality, excluding the cases of diarrhœa when the diagnosis was not established, was 58 per cent.—*Münchener medicinische Wochenschrift*, 1892, No. 41, S. 722.

The Comparative Actions of Antipyrine, Phenacetine, and Phenocoll on the Circulatory and Heat Phenomena.

Drs. David Cerna and William S. Carter record their conclusions as follows: 1. *Antipyrine* in small and moderate amounts produces a rise of the arterial pressure, this stimulating effect being due to an action upon the heart. 2. The lowering of the pressure by large or toxic doses is due similarly to a depressant effect of the drug upon the cardiac organ. The remedy does not seem to influence the vasomotor system. 3. Antipyrine causes an increase in the pulse-rate through paralysis of the cardio-inhibitory centres. The secondary decrease in the number of pulsations is of purely cardiac origin, the drug exercising a depressant effect upon the heart itself. 4. In excessive doses only, it changes the hæmoglobin of the blood into methæmoglobin. 1. *Phenacetine* in moderate doses causes a rise of arterial pressure by acting upon the heart, and probably, likewise by a stimulating influence exercised on the vasomotor system. 2. The reduction of pressure by the drug in large amounts is mainly of cardiac origin. 3. It increases, in small doses, the force of the heart by direct action. 4. It increases the pulse-rate chiefly by cardiac stimulation, and possibly also by influencing the cardio-accelerating apparatus. 5. It reduces the number of the pulsations, especially when given in large quantities, primarily by stimulating the cardio-inhibitory centres, and later, by a depressant action upon the heart. 1. *Phenocoll* in ordinary amounts has practically no effect upon the circulation. 2. Large doses diminish the blood pressure by influencing the heart. 3. It reduces the pulse-rate by stimulating the cardio-inhibitory centres. It then increases the rapidity of the pulse by paralyzing these centres. The final diminution is of cardiac origin. 4. Upon the blood itself it has no action. In regard to *heat*

phenomena it was found—1. That all three fail to produce any effect on the heat functions of the normal animal. 2. Antipyrine produces a decided fall of temperature in the first hour after its administration to a fevered animal. This reduction is due to a great increase in heat distribution, together with a fall in heat production. 3. Phenacetine, both in septic and albumose fevers, produces a very slight fall of temperature during the first and second hours after its ingestion by the stomach, but the greatest reduction occurs the third hour after its ingestion. The fall of temperature results chiefly from a decrease in heat production, with a slight increase in the heat distribution; the increase in distribution is not so great as with antipyrine. Probably the delayed action of the drug depends upon its insolubility. 4. Phenocoll causes in fever a very decided fall in temperature, which occurs the first hour after the administration of the drug by the stomach. This reduction is the result of an enormous diminution of heat production, without any alteration of heat distribution.—*Notes on New Remedies*, 1892, No. 4, p. 49.

MEDICIN .

UNDER THE CHARGE OF

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A Case of Phlegmonous Gastritis and a Case of Sub-phrenic Abscess.

Meyer (*St. Petersburger medicinische Wochenschr.*, 1892, No. 40, p. 373) reports the case of an engineer, forty-one years old, who, a day after participating in a social gathering, complained of a feeling of indisposition. In the evening a chill occurred, and the patient began to act strangely. Later in the night vomiting of bile and mucus set in. On the following days the vomiting continued; the abdomen was tender; the pulse was small, hard, and regular; the pupils were small and sluggish; the temperature was elevated; delirium continued; albumin appeared in the urine; slight jaundice developed; the area of hepatic percussion dulness became increased and painful; posteriorly the pulmonary percussion note was impaired to the level of the spine of the scapula, with enfeeblement of the respiratory murmur, while, above, the breathing was bronchial. The patient failed to improve; pulmonary œdema set in, and death took place. At the autopsy the right pleural cavity contained a small quantity of turbid fluid, the left pleural cavity clear serum with numerous gelatinous fibrin-coagula. The

pericardial sac also contained an excess of clear yellow serum. The diaphragm was elevated, so that the heart lay horizontally. The diaphragmatic surface of the liver, as well as the lower extremity of the ileum just above the ileo-cæcal valve, was covered with pus and fibrin. The small pelvis contained turbid purulent fibrinous fluid. The spleen was conspicuously enlarged. The biliary passages were patulous. The portal vein contained a recent thrombus. The fundus of the stomach presented numerous ecchymoses; close to the cardia, on the posterior wall, was an ill-defined circumscribed area, on incision in which two longitudinal cavities were found, three-quarters of an inch long, containing thickened pus, and seated between the mucosa and the muscularis. The peritoneum at a corresponding situation was infiltrated with pus. The inner surface of the dura mater presented traces of a yellowish deposit.

The second case occurred in a girl, twenty-one years old, who had long suffered with gastric derangement, and who was suddenly seized with symptoms suggestive of the rupture of a round ulcer of the stomach, followed by circumscribed peritonitis. The intense pain in the epigastrium subsided, however, but sharp pain appeared in the left hypochondrium, without demonstrable pleurisy. The temperature was elevated. After ten days slight cough set in, with scanty, rusty expectoration, the sputum containing elastic fibres and fatty pulmonary epithelium. At the same time a small area of dulness on percussion was evident at the base of the left chest posteriorly, with enfeebled respiratory murmur and fine moist râles. A few days later, blowing breathing was present at the inferior angle of the left scapula. Metallic tinkling could be heard. The left hypochondrium was tumid and tender to touch. After a time dark flakes, of a horribly offensive odor, were vomited. Asthenia became progressively more pronounced, and death took place twenty-six days after the beginning of the attack. At the autopsy a large cavity, with dark, gangrenous, disintegrating walls, was found beneath the left half of the diaphragm, bounded on the right by the left lobe of the liver and the suspensory ligament of the liver, anteriorly and inferiorly by the stomach and the transverse colon, and on the left by the spleen. The stomach communicated with the abscess by a small opening on the lesser curvature, which constituted the centre of a cicatrix of considerable size. The diaphragm contained four round discolored disintegrated areas, corresponding with which four small areas of infiltration were found in the adherent and pneumonic lung.

Addison's Disease with Tuberculosis of the Supra-renal Bodies.

Desnos (*Gazette des Hôpitaux*) has reported the case of a chambermaid, twenty-six years old, without hereditary predisposition, who had variola and measles or scarlatina in childhood. Menstruation appeared first at the age of fifteen years, and recurred every ten days or two weeks. Dyspeptic symptoms had long been present; the appetite was impaired; there was heaviness after taking food; digestion was painful; and constipation was habitual. At the age of twenty-two the patient had "catarrhal fever," with diarrhœa and vomiting. Immediately after this illness it was observed that the skin had become discolored. At the age of twenty-three, vomiting and diarrhœa

reappeared for three days and three nights, being followed by a febrile period of a month, the subsequent convalescence extending over a period of six months. Shortly before coming under observation a slight hæmoptysis had occurred. The woman had never been pregnant. Three weeks before admission to the hospital the patient was seized with a sensation of intense cold in the back, together with a sense of weakness, necessitating her taking to bed. The appetite had entirely disappeared. In two weeks considerable emaciation had taken place (from having weighed one hundred and forty pounds the patient weighed but seventy-five pounds). Vomiting was frequent. Constipation had been replaced by diarrhœa. Asthenia was most profound. The voice was feeble and slow. The face was covered with perspiration. The skin was bronze-colored, most prominently in those situations that are commonly exposed to the air. The pigmentation was most decided upon the face, the nucha, the dorsa of the hands, in the groins, on the breasts, on the internal surfaces of the knees, in the linea alba below the umbilicus and upon the free border of the greater and lesser lips of the vulva. The middle third of the external surface of the right arm presented several pigmented patches. The inner surface of the cheeks presented three or four areas of pigmentation on each side, and there was another area under the tongue. No evidence of the existence of malarial infection could be obtained. There was no history of syphilis. The patient stated that at certain times the pigmentation seemed to temporarily disappear. There was complaint of intermittent headache; of pains in the members and in the joints; epigastric pain was decided, and there was pain in the lumbar regions; occasionally girdle-pains were present. Sensation was preserved, except in the pharynx, where there was anæsthesia. The knee-jerks were preserved. Sleep was disturbed by frightful dreams. In both lungs subcrepitant râles could be heard in the supra-spinous regions. The quantity of urine passed and the proportion of contained urea were less than normal. The number of red corpuscles in the blood was normal; the proportion of hæmoglobin reduced more than half. Death resulted from asthenia. The temperature had been irregularly elevated. At the post-mortem examination the lungs were found to be tuberculous at the apices; the left lung presented cavities filled with cheesy matter; in the right were a number of calcareous areas. The supra-renal bodies were large and bound by adhesions to the kidneys; the right body was also adherent to the liver; it was bosselated and its surface was irregular. On section, both were in process of cheesy degeneration, in parts calcified. Histologically, they presented the appearances of tuberculosis at various stages. A lymphatic gland removed from behind the liver presented similar lesions.—*L'Abeille Médicale*, 1892, No. 48, p. 380.

Superficial Dissecting Œsophagitis.

Rosenberg (*Centralbl. f. allgem. Pathologie u. pathol. Anatomie*, Bd. iii., No. 18, p. 753) has reported the case of a heavily built man, twenty years old, who had for two years suffered with dyspeptic symptoms, for the relief of which he had confined himself to a liquid diet, exercising great care in deglutition. There was alternate improvement and aggravation of the man's condition. Fever was absent. No obstruction to the passage of the sound was

encountered in the œsophagus. On one occasion the patient was seized with vomiting and retching associated with a sense of suffocation, in the course of which he ejected a tube of membrane about seven inches long, with walls of varying thickness, and the external surface of which was streaked with blood. On section and microscopic examination the membrane was found to be composed of five layers; the innermost and principal layer consisted of normal large, apparently healthy pavement epithelial cells, with oval nuclei that stained well; next came a layer of delicate granular fibrin in which a few leukocytes were imbedded; then came a layer made of horny epithelial cells without nuclei, arranged concentrically in lamellæ-like epithelial pearls, and which stained poorly or not at all; the fourth layer was constituted of globular conglomerations of leukocytes that stained fairly well; the last layer was made up of globular collections of unchanged epithelial cells, without nuclei, that stained well.

Rosenberg refers to the case reported by Birch-Hirschfeld as pseudo-croupous œsophagitis, and to that reported by Reichmann as exfoliative œsophagitis, and prefers the designation "superficial dissecting œsophagitis" as the most applicable to his case.

The Quantitative Relations of the Blood Corpuscles in Variola and its Complications.

Pick (*Prager med. Wochenschr.*, 1892, No. 40, p. 463) has reported the results of a study of the blood in forty-two cases of variola. Most of the cases came under observation early and examinations were made daily. In the stage of eruption the number of white corpuscles was, as a rule, found not increased, but as soon as the eruption had been completed in the apyretic stage of the formation of vesicles, or as soon as the contents of the vesicles began to become turbid—*i. e.*, on about the fifth or seventh day—an increase in the number of white cells usually set in, the earlier the more severe the attack, and mostly before the temperature had risen. In the further course of the leukocytosis the number of white corpuscles corresponded with the elevation of temperature; the leukocytosis, however, reached its acme about two days before the acme of the suppurative stage. The degree of leukocytosis was in general in proportion to the intensity of the attack. At no time was a considerable diminution in the number of red cells found. Lobular pneumonia was the most common complication, appearing in 12 of the 42 cases, and 10 of which terminated fatally. In eight of the last there was no leukocytosis; the other two had complications. In the two cases complicated by bronchopneumonia that recovered there was pronounced leukocytosis. Six cases in which bronchitis occurred as a complication presented leukocytosis. The occurrence of abscesses was also attended with leukocytosis.

A Fatal Case of Noma in an Adult.

Hansson (*Centralbl. f. Chirurgie*, 1892, No. 41, p. 845) has reported the case of a man, fifty-five years old, who had the carious first molar tooth of the upper jaw removed. There was also a pretty firm œdematous swelling of the entire right cheek, and inspection of the mouth disclosed the existence of a stomatitis. Energetic antiphlogistic measures were at once instituted,

but the swelling of the cheek progressed in intensity, the lower eyelid becoming involved. The skin of the cheek was tense, pale, and of a waxy appearance. In the mouth, opposite the site of the extracted tooth, was a necrotic area as large as a cherry-stone. This was excised, and a thorough application of silver nitrate made. The mouth was frequently washed with antiseptic solutions. The swelling diminished somewhat, but the gangrene extended. The discharge of saliva was abundant and offensive. The gangrenous tissue was again excised, but the process was not controlled; on the contrary, it extended to the neck, to the nose, and to the ear. The gangrene became more profound; symptoms of septicæmia appeared; and a purulent bronchitis developed to which the patient succumbed. An autopsy could not be held.

Valvular Lesions of the Heart and Pulmonary Tuberculosis.

Lannois (*Revue de Médecine*, 1892, No. 10, p. 830) calls attention to the infrequency of the association of valvular disease of the heart and pulmonary tuberculosis in the same person, and reports an illustrative case. A blacksmith, thirty-nine years old, had had an attack of enteric fever at the age of five, followed by convulsions; at seventeen, an attack of acute articular rheumatism, with pericarditis; at twenty-three, a second attack of rheumatism, with endo-pericarditis; three years later, a third attack; and three years later, a fourth attack. From the age of eighteen years he had had a winter cough. Following the last attack of rheumatism the appetite had failed, strength and flesh had been lost, and albumin had appeared in the urine. The respiratory murmur became enfeebled below the clavicles; sonorous râles were heard posteriorly and at the bases, while the cough developed sibilant râles. The patient became ill at ease, felt slightly feverish, and took to bed. It was found that the temperature was 105°. Oppression of the chest set in. The sputum became nummular. Sibilant and subcrepitant râles were to be heard. The number of respirations was increased. Dyspnœa became marked and aphonia appeared. The patient grew progressively worse and finally succumbed. At the post-mortem examination the right pleural cavity was found obliterated by adhesions. Both lungs were congested. Beneath the pleura numerous gray granulations were visible, while the anterior margins of the lungs were emphysematous. On section, granulations, some of which were caseous, were found throughout both lungs, but in greatest number at the apices. The glands at the hilus of the lung were enlarged, but not caseous. The kidneys contained numerous miliary tubercles. The spleen was enlarged, the liver fatty. The heart was bound to the pericardium by old adhesions. Neither the organ nor its serous sac presented evidence of tuberculosis. Both the aortic and the mitral leaflets were thickened and the two valves were manifestly incompetent.

Antiseptic Treatment of Pernicious Anæmia.

Dr. G. A. Gibson (Edinburgh), acting on the suggestion of Dr. W. Hunter, that the destruction of the blood in this disease may be due to the presence of toxic bodies originating in the alimentary canal, treated a case of per-

nicious anæmia with β-naphthol. The patient, a man, aged fifty-five years, presented all the classical features of the disease with the exception of dark urine and retinal hemorrhages.

On admission there were 800,000 red corpuscles per cubic millimetre, with obvious changes in shape and size.

Arsenic was tried first, but rapidly abandoned on account of gastric symptoms. Protochloride and perchloride of iron were next tried, but the patient continued to lose ground so much that transfusion (six ounces of defibrinated venous blood) was performed. Two days later the red corpuscles were 1,120,000; but by the end of a week they had fallen again to 920,000, and the patient's strength was rapidly failing. β-naphthol was now given thrice daily in 2-grain pills and continued for three weeks. There was considerable intestinal disturbance during this period, and during the first week of treatment the red corpuscles fell from 1,000,000 to 800,000. A severe attack of diarrhœa now supervened, during which the administration of the antiseptic appears to have been withheld. It abated at the end of a fortnight, when the general condition was noted as being distinctly better, anæmia of mucous membranes less marked, and red corpuscles 1,600,000. β-naphthol was again given twice a day, and the patient from this time continued to make satisfactory progress. The author is disposed to attribute the good result to the antiseptic. By way of control-experiments he has administered -naphthol to several anæmic patients and so far has observed a notable increase in the number of red corpuscles.—*Edinburgh Medical Journal*, 1892, No. 448.

Amœbæ in an Abscess of the Jaw.

Flexner (*Johns Hopkins Bulletin*, 1892, No. 25, p. 104) has reported the case of a man, sixty-two years old, who, nearly two years before coming under observation, had noticed a small hard lump within the mouth, beneath the gum, at the anterior part of the inferior maxillary bone, just to the right of the middle line. After two months the tumor was removed by an operation. Five months later an ulcer appeared at the site of operation, exposing the bone. A slight discharge set in and continued thereafter. In the course of fourteen months a hard swelling again appeared on the floor of the mouth, gradually increasing and extending beneath the chin to the front of the neck and below the jaw, forming a large and prominent swelling that occupied the entire space included within the arch of the inferior maxillary bone. The width of the mass corresponded with that of the lower jaw. The growth extended backward to the angle of the jaw and downward to the cricoid cartilage. It was firm, indurated, and immovably fixed, and felt like a solid growth. At the most prominent point of the tumor in front, however, tenderness was present and fluctuation could be detected. The teeth of the lower jaw were deficient. On the upper aspect of the transverse portion of the inferior maxilla the bone was denuded in a situation corresponding with the two incisors and the canine tooth of the right side. The exposed bone appeared spongy and was evidently necrotic. It was in part covered with dirty grayish purulent matter and shreds of greenish sloughing tissue. On making firm pressure over the tender and fluctuating area on the anterior aspect of the swelling, a small amount of dirty purulent material was

observed to ooze from an opening in the mouth over the necrotic bone. The breath was offensive. There was no glandular involvement. An incision evacuated about two and a half ounces of pus and exposed a large abscess cavity, the walls of which were quite thick. The necrotic bone was thoroughly scraped, the abscess cavity packed with iodoform gauze, and a dressing applied. The man did perfectly well, and at the time of the report bade fair to recover. The pus evacuated was grayish-yellow in color and extremely offensive in odor. It was not thick, but was mixed with a small quantity of blood, and contained a number of flakes and granules of lighter color and more opaque than the other constituents. Microscopic examination disclosed the presence of pus-cells, red blood-cells, bacteria, and amœbæ indistinguishable from the amœbæ dysenteriæ; the last were especially abundant in the flakes. Subsequently, examination of the contents of the drainage-tube employed disclosed the presence of the same organisms. There was no history of diarrhœa.

A Case of Pneumonia followed by Induration.

Fraenkel (*Deutsche medicin. Wochenschr.*, 1892, No. 43, p. 933) has reported the case of a man, forty-nine years old, who a year previously had suffered a left hemiplegia, the symptoms of which soon disappeared. It was noticed that from this time respiration had become stridulous. Four weeks before coming under observation the patient had been seized with an acute illness, attended with cough, rusty expectoration, and dulness on percussion over the lower lobe of the left lung, and which was thought to have been a pneumonia. The patient, however, failed to recover. There was atypical fever of remittent character, with evening exacerbations. Dyspnœa was marked and became aggravated in paroxysms. There was dulness on percussion of the left half of the chest, anteriorly and posteriorly, with a sense of board-like resistance, extending in a narrow band to the right of the sternum as low as the third rib. Within these limits the respiratory sounds and the vocal resonance were wanting. It was observed that the left radial pulse was smaller than the right. In hope of relieving a sudden attack of dyspnœa, the chest was punctured and nearly two pints and a half of bloody fluid permitted to escape. The difficulty in breathing was, however, not relieved. On further examination, slight systolic pulsation was detected on the anterior aspect of the left chest. The heart-sounds were obscure; the first sound at the apex was accompanied by a faint murmur. It was believed that there existed a sacculated aneurism of the aorta or a new-growth of the lung. The absence of enlarged glands was, however, opposed to the latter supposition. The patient died, and at the post-mortem examination the left lung was found voluminous, and in its upper portions adherent to the chest-wall. On section, the organ presented the appearances of carnification; the cut surface was smooth; the parenchyma was solid, dense, and tough, and presented numerous yellow points of fatty degeneration, corresponding with individual alveoli or groups of alveoli, in places constituting large areas. Microscopically the alveoli were found to contain a vascularized connective-tissue formation of inflammatory origin, with proliferated alveolar epithelial cells, and in places fibrin. The trachea was eroded above the bifurcation in consequence

of the pressure of an aneurism of the arch of the aorta, as large as a man's fist, and involving a considerable portion of the descending aorta as well.

Little is known of the conditions that lead to induration of the lung in cases of unresolved pneumonia. Some authorities believe that the condition is dependent upon the growth of young capillaries from the walls of the alveoli, analogous to the formation of a thrombus. Others make loss of the alveolar epithelium an antecedent condition. Fraenkel reports, in a previous case, having found in the tissues of the indurated area streptococci in pure culture, upon the presence of which he believes the process to be dependent.

SURGERY.

UNDER THE CHARGE OF

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THE RADICAL CURE OF CRURAL HERNIÆ.

IN reviewing the history of this subject, the following methods and their authors are quoted by SALZER (*Centralbl. für Chir.*, 1892, No. 33): Billroth sews the middle third of Poupart's ligament to the deep fascia, or unites it to the middle septum of the femoral sheath, using a triple silk suture. Czerny uses catgut; Schede, catgut, silk, or silver wire; the latter he has used since 1887, and finds it more certain, and also that it may remain *in situ* without harmful results. He had one relapse in four cases, which he had under observation—this relapse occurring after five years. Lauenstein united the falciform process and Gimbernat's ligament after folding the sac in the manner employed by Macewen in inguinal herniæ. Bergen fixes the ligated stump of the hernial sac above Poupart's ligament, and sutures the ligament to the aponeurosis of the pectineal muscle, producing a direct union. He advises that the thigh be flexed upon the pelvis during healing.

The author believes that in all these methods, where tension is employed by means of sutures, the resulting scar tissue is of doubtful utility, as has been shown in the relapse in Schede's case after five years, and advocates the following method, which he has employed successfully: A curved incision is made in the pectineal fascia beneath the femoral vessels, extending from near the crista pectinea to Gimbernat's ligament; a flap is dissected up, its base proximal and joining Gimbernat's ligament; the free or distal border he unites by silk sutures, without tension, to the middle third of Poupart's

ligament. Thus is formed a strong fibrous septum, which he deems a practical and certain method for the radical cure of these herniæ. His researches on the cadaver have shown that the pectineal fascia varies in thickness, and his observations during his operations lead him to believe that it is thickened in persons who have worn a truss, and in general is thicker in adults.

[Cushing, of Boston, after returning the gut, fastens the sac as a pad in the femoral ring, doubling it on itself, as in Macewen's operation, and sewing it by ligatures which at the same time pass through Poupart's ligament and the pubic portion of the fascia lata, thus closing the ring. The saphenous opening is also closed by slipping the pubic fascia under the sartorial fascia and suturing them together. I have used this method several times with great satisfaction.—J. W. W.]

Treatment of Gangrenous Hernia.

Ransohoff (*Annals of Surgery*, vol. xvi., No. 4) reports two cases of recovery in four of gangrenous hernia. In one the gangrenous portion of gut was fastened in the floor of the wound, and allowed to form a fistula and artificial anus, finally contracting and closing spontaneously. In the other case of recovery, fourteen inches of gut were removed, and an enterorrhaphy performed. The author believes primary resection to be the ideal method, and the one that should be attempted if the patient's condition will permit, but admits that in some cases the suturing of the intestine in the bottom of the wound, and dressing with antiseptic precautions, is a procedure of merit.

The disadvantages of primary resection as to the time it requires and the danger of peritonitis may be overcome by using a simple running Lembert suture, with occasionally an interrupted suture at points that seem weak. The septic danger is to be overcome by careful irrigation of the sac before opening the hernia, packing it with sterilized gauze, and opening and suturing the gut external to the wound so far as is possible, and furthermore, by leaving the wound open, packed with gauze and dressed antiseptically, the gut being controlled by a suture fixing it just within the wound, and thus providing drainage for any dangerous oozing. Many fatal results have occurred from returning into the abdomen suspicious-looking intestine, and in such cases he advises fixing the gut in the wound by antiseptic gauze until all danger of subsequent gangrene has passed.

Surgery of the Spinal Cord.

Chipault (*Rev. de Chir.*, 1892, No. 8) describes the following methods of attacking the spinal cord: A linear longitudinal incision of considerable length over the posterior spines of the vertebræ is the best. This is carried into the deeper structures, the periosteum being raised and preserved as far as possible, in order to secure the bony covering of the wound after operation. Hemorrhage is stopped by compresses before the canal is opened. This he considers most effectually and safely done by the trephine, followed by cutting forceps one of whose blades is smooth and flat and can be introduced between the dura mater and the bone without danger, making a smooth opening that will not injure the membranes. The amount to be removed depends entirely on whether the object sought has been found or not.

The surgeon's duty does not end with the exploration of the extra-dural space, and the removal of tumors, clots, or spiculæ of bone that may be there present. The dura mater must be incised and its cavity explored, except where a peri-pachymeningitis might lead to further infection, or after extra-dural tumors have been found and removed; in a case of fracture it is always a necessity, or where there is an absence of pulsations synchronous with the pulse and respiration. The pre-dural adipose tissue should first be removed, then the incision is best made between two forceps that raise the dura mater and afterward serve as retractors. As the cerebro-spinal fluid pours out, the pulsations cease, and the outpouring ceases also after a few minutes. Then examinations can be made, tumors removed, and the partially or entirely severed cord sutured. The dura mater should then be sutured without drainage, to prevent the further escape of fluid, only the superficial wound being drained. To attack the anterior and lateral surfaces of the cord, the patient should be placed on two cushions, lying on the opposite side to the one to be investigated, and in such a manner that the spine makes a downward curvature between the cushions; by this curvature it is possible to rotate the cord on its longitudinal axis, and view either half as the case requires. It is also possible to introduce instruments between the lateral branching nerves and remove fungous growths on the bone or any in the canal, as also tumors. He also details operations of puncture for hydrocephalus, suture for fracture and dislocation, and warns operators against the effect of shock from anæsthetics, which he believes greater in these operations than in others.

[I have found the use of the trephine unnecessary in opening the canal. The dura can be best stitched by means of staphylorrhaphy needles.—J. W. W.]

Musculo-spiral Paralysis in Fractures of the Humerus.

Murray (*Annals of Surgery*, vol. xvi., No. 4) reports a case of musculo-spiral paralysis due to fracture of the humerus and improper dressing, and cured by resection of callus and the refracture and setting of the bone. He also adds 11 cases to the 79 already collected by Burns. Forty-two per cent. were treated by operation, and in almost all the nerve function was restored, while in only three cases was the nerve found to be divided. He advocates immediate operation for the relief of a paralysis after fracture, and also advises careful examination in all cases of fracture for signs of paralysis, before dressing. The preferable method of investigation is to find the nerve, either above or below the suspected point, and approach it gradually, thus lessening the danger of injury to it.

The Treatment of Renal Wounds after Nephrotomies.

After reviewing numbers of cases in which spontaneous closure of the fistulæ was consecutive to nephrotomy, Guyon (*Annales des Mal. des Organes Genito-urinaires*, 1892, No. 9) concludes that in all cases of pyonephrosis nephrotomy is indicated, but that the character of the consecutive treatment is less easy to decide upon. The history of cases already reported shows that where the ureter remains patulous, there will be spontaneous closure of the wound, and that it is far preferable to allow this healing than to try to hasten

it by operative measures. Simple antiseptic drainage is all that is required. In cases where the ureter is obliterated there have been spontaneous closures of the fistulæ after nephrotomy, followed by contraction and loss of function in the kidney, but where this does not occur the nephrotomy makes an intracapsular nephrectomy easy. In other words, nephrotomy is recommended as the primary operation, while nephrectomy is only indicated in cases in which the occlusion of the ureter has been demonstrated, and the fistula fails to close.

[Preliminary nephrotomy certainly reduces the mortality of nephrectomy, but that it makes that operation "easy" I can scarcely believe, in the light of my own experience. The atrophied and immovable kidney, bound down by numerous adhesions, is far more difficult to handle and to isolate than the same organ at an earlier period of disease.—J. W. W.]

Resection of the Entire Ilium.

Nélaton (*Rev. d'Orthopédie*, 1892, No. 5) reports a case in which the whole ilium was invaded by caseous and fungous masses. The entire bone was removed after the separation of the internal periosteum, by a division through the ilio-sacral articulation, the horizontal ramus of the pubis, and the postero-superior portion of the acetabulum. There was no involvement of the joint, and after thorough curetting, drainage, and antiseptic treatment the patient made a good recovery. A new fibrous articulation formed in a position corresponding to the external iliac fossa, there was shortening, but the use of a high shoe and cane enabled the patient to walk moderate distances. The author reports the case as a pathological curiosity and to show that with less than one ilium it is possible for a person to walk easily and well.

Operations on the Superior Maxilla.

Pantaloni (*Arch. Prov. de Chir.*, 1892, No. 3) concludes that by the use of the position recommended by Rose in operations upon the superior maxilla, the use of the gag of O'Dwyer, the fixation of the tongue by forceps, and the hæmostatic use of tampons, perfect antiseptic conditions can be had without the annoyance of hemorrhage during the operation, while complete narcosis can be maintained throughout the operation by the interrupted method of chloroform anæsthesia. These methods, he believes, make unnecessary a previous tracheotomy and ligation of the external carotid, as also ligatures during or after the operation.

The Results of 572 Tracheotomies for Diphtheria.

Habs (*Deutsche Zeitschr. f. Chir.*, Band xxxiii., Heft 6) reports 572 cases of tracheotomy for diphtheria, with 316 deaths, or a mortality of 55¼ per cent., extending over a period of six years, and showing a decrease of 9 per cent. between the first and last periods of three years each. The operation was most seldom performed in April, May, June, July, and August, and during these months the percentage of mortality was likewise the least. It increased gradually from that time, reaching its maximum in March, then decreasing.

The average length of treatment was sixteen to twenty days. The most children died in the first five days after the operation, nearly as many dying on the fourth day as on the day of operation; then the danger decreases till the eighth or ninth day, when pneumonia is to be feared as a cause of death. A relatively good prognosis can therefore be given in those cases in which the patient passes the fifth day, except where intercurrent complications appear. The best cases are those in which, after the operation, the breathing is free, no membranes are found, the pulse good, fever slight, and little albumin is present in the urine; while those cases are unpromising in which the breathing is not free, where slight retraction of the chest walls continues, and deep-seated membranes or a tendency to pneumonia are present—yet they are not hopeless, and, on the other hand, even in the most hopeful cases there are the secondary sequelæ to be feared.

The mortality is very high in the first two years of life, then falls, rising again during the sixth and ninth years to 40 per cent., and after the tenth rising to 59 per cent.; this is to be accounted for by the severe type that attacks older children. There is a greater percentage of deaths among male children than among female, and also more males are attacked by the disease.

[These results, which seem to show a percentage of recoveries of 44¾ per cent., are more favorable than are usually obtained in this country, where I believe the figures show 28 to 33 per cent. of successes. It is probable that H.'s cases were operated upon at a very early stage, as hospital patients abroad usually submit more promptly and unquestioningly to surgical measures than in America.—J. W. W.]

The Sterilization of Iodoform Emulsions before their Injection in Arthritic Disease.

Steubenrauch (*Centralbl. f. Chir.*, 1892, No. 34) recommends that before each injection the iodoform emulsion be sterilized. This will prevent the inflammatory symptoms that have sometimes followed, which he attributes either to the free iodine found in the solution after sterilization, or, on the other hand, to the pathogenic organisms present before. He also recommends the following emulsion in place of the glycerin: 20 parts alcoholic iodoform, 180 parts of a 5 per cent. solution of gum arabic.

The Radical Cure of Diaphragmatic Hernia.

Schwartz and Rochard (*Rev. de Chir.*, 1892, No. 9) propose the following method of operation for the relief of strangulated herniæ in this region and its radical cure. The patient being placed on the right side upon a cushion, an incision either T, H, or U shaped is made over the ninth rib, a musculo-cutaneous flap is raised and the rib resected, with the deeper soft parts, the pleura incised. The lung ascends and the diaphragm and hernia are brought into view. This method places the surgeon in a position analogous to that in other hernial operations, and allows perfect antiseptic precautions, without the danger, in case of gangrene, of infecting the uninfected abdominal cavity. The condition after the sewing up of the external

wound is one of pneumothorax, which will disappear little by little, or if a pyo-pneumothorax supervene the wound for drainage is already made, and the removal of a few sutures is all that is required. The authors believe that in consideration of the desperate character of the patient's condition, and the greater dangers involved in a cœliotomy and the consequent infection of the peritoneal cavity, this operation gives an increased chance of success, though exposing the patient to a pneumothorax.

They do not recommend it in the case of hernias that are entirely anterior, and therefore easily operable by a cœliotomy. The same methods applicable to hernias in other situations are to be used here, as enteroplasty in case of gangrene of the intestine, or an analogous method in case the stomach is involved.

Abscess of the Spleen.

Stalker (Dundee) reports the case of a man who was seven years in the army and had had Malta fever and enteric fever. He enjoyed good health for two years subsequently. On admission to a hospital, after a fortnight's illness, he was suffering from pain in the left flank, with fever and splenic enlargement. The fever was of continued type, but latterly remittent without abatement of symptoms. He sank of pyæmic exhaustion at the end of five weeks. A general diagnosis of enteric fever was made, but there were puzzling symptoms throughout. There was a large splenic abscess containing about twenty ounces of pus. There was no ulceration of the bowel. —*Lancet*, 1892, No. 3607.

Prostatectomy.

The following new method in prostatectomy is described by Tobin (*Medical Press*, September 21, 1892). After supra-pubic cystotomy has been performed, and the diagnosis of enlarged prostate confirmed, a straight urethral écraseur is passed *per urethram* until the point touches the prostate at the level at which it is desired to operate; the wire loop is then opened and made to encircle the portion to be removed, an incision being made with scissors if required; the loop is then kept imbedded by two fingers passed through the abdominal wound, and, guided by them and the écraseur, cuts in the plane desired. The lateral lobes may be removed in like manner, incisions being made if required for the passage of the loop. The author claims the following advantages for this method: "1. As much of the gland as interferes with the escape of urine is removed, and no more. 2. Such portion is removed in a satisfactory manner, for the wire cuts up to the portion where the instrument has been stopped by the obstruction. 3. A smooth surface sloping into the urethra is left, instead of the more or less rough one that must result from taking away the gland piecemeal with a forceps. 4. There is very little hemorrhage." He also recommends the Trendelenburg position, and reports a case of recovery with perfect function in the sphincter, and no re-obstruction after six months.

[It appears to me that this method is worthy of trial. Unfortunately, at the present day the majority of cases of prostatic disease brought by their

medical advisers to the operating surgeon are in such an advanced stage of toxæmia that shock and hemorrhage, even of mild grade, are greatly to be dreaded. The theoretical grounds for believing that shock would be diminished by a procedure which admits of the removal of only the obstructing portions of the gland and no more, and the bleeding lessened by the use of the écraseur, seem to be well taken.—J. W. W.]

OBSTETRICS.

UNDER THE CHARGE OF

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Hæmatoma of the Sterno-mastoid Muscle in the Newborn.

In the *Journal of Pathology and Bacteriology*, 1892, vol. i., No. 1, Spencer reports fifteen cases of hæmatoma of the sterno-mastoid muscle, and gives two excellent illustrations of microscopic sections from these cases. In nearly three hundred autopsies on the newborn, Spencer has met with hemorrhage into the sterno-mastoid muscle in fifteen cases. So far as the sex was concerned, males and females were affected with equal frequency. The muscles on either side were equally affected. Small and prematurely born children were especially liable to this accident. In fifteen cases, the presentation was either a breech or footling either before or after version. The forceps was used in two cases, and two occurred after spontaneous labor. In one of the latter, however, the head was delivered by pressure with the fingers through the rectum; and in the other, delivery was hastened, as hemorrhage occurred in the mother. The hemorrhage was found in the anterior portion of the upper two-thirds of the muscle, the color of the tumor being dark red, and its consistence firm. Microscopic examination of a transverse section shows the intra-fascicular connective tissue infiltrated with blood; under a high power the blood is seen effused in large amount between the fasciculi. The result of this accident is the formation of fibrous interlacing bands in the muscle, which may cause wry-neck.

The Pathology and Prognosis of Eclampsia.

In the *Archiv für Gynäkologie*, 1892, Band xlii., Heft 3, Dührssen wrote upon the treatment of eclampsia, basing his recommendations upon the study of some two hundred cases. In the same journal, Band xliii., Heft 1, he describes these cases in detail, and draws some interesting conclusions from

them. He regards the cause of eclampsia to be an intoxication of the blood occasioned by the retention of creatin and creatinin in the kidneys of the pregnant patient; less frequently by an actual nephritis accompanied by congestion of the kidneys, by accumulation of urine through pressure upon the ureters, and by hydro-nephrosis. The creatin and creatinin accumulate in the vessels of the cerebral cortex, producing convulsions by their irritation, and coma. The immediate cause of an outbreak of eclampsia is irritation of sensory nerves in the genital tract, or profound disturbance of the emotional centres. Eclampsia can also be produced by the products of bacteria, and especially when the kidneys are in a congested condition; in other cases, when infective material or bacteria cause extensive disintegration of the red blood-corpuscles, with fatty degeneration of the kidneys, heart muscle, and mucous membrane of the stomach. In the latter cases, fatal gastric hemorrhage may occur during eclampsia. Prolonged narcosis favors such degenerative changes. In a few cases eclampsia is purely reflex, and is occasioned by abnormal distention of the uterus, or any other violent irritation of the nerves of the genital tract. General susceptibility to nervous impulses may be also a cause, as is seen in very young or very old primiparæ. In an analogous way, the engorgement of the kidneys, producing what is known as the "kidney of pregnancy," results from a reflex contraction of the renal vessels, occasioned by irritation of the genital region.

The prognosis of eclampsia becomes grave in proportion to the number of convulsions; death may occur after but few convulsions from disintegration of the blood, cerebral hemorrhage, or fatty embolism. In 93.75 per cent. eclampsia ceases after the uterus has been emptied in profound narcosis. Mortality from eclampsia is less after operative emptying of the uterus than after spontaneous labor. The mortality of eclampsia will become still less if operative measures are instituted as soon as the attacks begin. Such should be the treatment at every period of pregnancy. In 80 per cent. of cases of eclampsia, the methods of incisions into the cervix and incisions into the peritoneum and vulva will enable the operator to terminate labor promptly. In 10 per cent. mechanical dilatation by traction upon a kolpeurynter, inserted within the uterus, and accompanied by dilatation by incision will result favorably. Under strict antiseptic precautions the method described, accompanied by the use of the uterine tampon in cases of atony, is no more dangerous than spontaneous labor. Cæsarean section is not indicated for eclampsia. Operative procedures increase the danger in eclamptic cases only when the narcosis is not a deep one. Prolonged narcosis to control convulsions is dangerous, as it favors the occurrence of broncho-pneumonia, increases the disintegration of red blood-corpuscles and the fatty degeneration of vital organs. In eclampsia, where the uterus is greatly distended, death sometimes follows the inhalation of a small amount of chloroform. In these cases, the membranes should be ruptured before the beginning of the narcosis. Chloral, when given internally, becomes chloroform in the blood, and the use of chloral occasions the same dangers that accompany chloroform. Large doses of morphine are also dangerous because of the fatty degeneration of the heart muscle which exists in these cases. Under the operative treatment of eclampsia the maternal mortality should lessen to 25 per cent., and that of viable children to 50 per cent.

GYNECOLOGY.

UNDER THE CHARGE OF

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VAGINAL HYSTERECTOMY.

TERRIER and HARTMANN (*Revue de Chirurgie*, 1892, No. 4) draw the following deductions from thirty-six cases of vaginal extirpation: 1. Their mortality was 23 per cent. 2. They regard the operation as quite as justifiable as any operation for the complete removal of a malignant neoplasm, and no more dangerous. 3. Recurrence occurred in 70 per cent. of the cases, while the remaining 30 per cent. seemed to be permanently cured.

HYPERTROPHIC ENDOMETRITIS.

TREUB (*Centralblatt für Gynäkologie*, 1892, No. 42) properly emphasizes the fact, too little recognized, that this condition is not of inflammatory origin. It should be regarded as simply an hypertrophy of the endometrium, for reasons both anatomical and clinical. Anatomically it appears as an hypertrophy of either the glands or interstitial tissue, but infiltration with leukocytes is never observed unless a true endometritis coexists with the hypertrophy, when the latter will be found to be limited to the cervical mucosa.

Clinically, this condition of hypertrophy is never attended with inflammatory symptoms; menorrhagia, with rarely a profuse watery discharge, accompanied with more or less severe pain, being the only indications of an abnormal state of the endometrium. The fact that it is such a common accompaniment of subinvolution, retroflexion, fibro-myoma, and cancer of the cervix, shows that it is due purely to disturbances of circulation. It is never the primary result of infection.

MYOMOTOMY.

TIPJAKOFF (*Centralblatt für Gynäkologie*, 1892, No. 42) reports twelve successful cases of supra-vaginal amputation for fibro-myomata. He curettes the uterine cavity the day before the operation, irrigates with tincture of iodine, and tampons the vagina with iodoform gauze, the latter being replaced just before operation. After removing the tumor, the cervical canal is disinfected with a 10 per cent. solution of carbolic acid, and the surface of the stump, after being trimmed out in the centre, is treated with iodoform and ether, after which its opposed surfaces are united with a continuous silk suture. Finally, the peritoneal flaps are united over the stump in such a way that the line of suture shall not lie directly over that of the stump. The rubber cord is only applied until the tumor is excised, the ovarian and uterine arteries having been previously ligated, when the cord is removed and the stump, after being treated as above described, is dropped back into the cavity.

Traction as an Aid in the Removal of Solid Abdominal Tumors.

Reverdin (*Archives Provinciales de Chirurgie*, October, 1892) describes and figures an ingenious but somewhat complicated method of elevating large tumors during abdominal section, the principle being the same as that long practised in operations for elephantiasis of the scrotum. The apparatus is not unlike an ordinary hay-fork, such as is run by horse-power.

[One cannot avoid the conclusion that, however satisfactory the apparatus may be in the hands of its distinguished inventor, its use is opposed to an important principle in modern surgery—the simplification of technique. By placing the patient in Trendelenburg's posture one secures all and more than all the advantages claimed for the traction method.—H. C. C.]

The Enucleation of Intra-uterine Fibroids per Vaginam.

Chrobak (*Sammlung klin. Vorträge*, No. 43) reports forty-three cases, with one death from hemorrhage. The tumors most capable of removal in this way are those growing from the cervix and those projecting into the uterine cavity. The uterus must be movable and the cervix dilatable. If several sub-peritoneal fibroids or diseased adnexa are present at the same time, cœliotomy is preferable. The writer incises the cervix freely if necessary, sometimes ligating the uterine arteries or their lower branches beforehand. He insists that the tumor shall be removed at one sitting, even if the operation is prolonged. After removing the neoplasm he irrigates, and then tampons the uterine cavity with gauze.

The Abdominal Enucleation of Uterine Fibro-myomata.

Chevrier (*Nouv. Arch. d'Obstétr. et de Gynécol.; Centralblatt für Gynäkologie*, 1892, No. 40) prefers this method of removing smaller tumors to myomotomy, believing that there is less hemorrhage, and that the uterine cavity is not opened. The objection that small tumors are overlooked when the entire uterus is not removed does not hold if careful examinations are made before and during the operation. The convalescence is usually rapid and easy. One hundred and twenty-five cases are reported, with a mortality of 16 per cent.

Pelvic Troubles due to Movable Kidney.

Thiriar (*Centralblatt für Gynäkologie*, 1892, No. 42) thinks that movable kidney is more often the cause than the result of disturbances of the female genital organs. In many cases it is to be regarded as the cause of uterine displacements, oöphoritis, and salpingitis. He found movable kidney in 20 per cent. of his gynecological cases. In eleven patients who had been variously treated by curettement and castration (in one instance vaginal hysterectomy having been performed) without benefit, he found a mobile kidney, and performed nephrorrhaphy in ten cases with entire relief of the symptoms. He explains the pelvic symptoms as due to the intimate anastomoses between the renal and ovarian nerves. Doubtless the movable kidney also compresses

the veins of the spermatic plexus, and in some instances the renal vein or even the vena cava.

[Since gynecologists have begun to direct their attention to the subject of movable kidney, one cannot avoid the suspicion that the frequency of the condition, its importance, and its intimate relation to pelvic troubles, have been somewhat exaggerated. Doubtless it is common in women, but less so than recent writers would have us believe. As for the relief afforded by nephrorrhaphy, it is well to remember, as Osler cautiously remarks, that "it does not always succeed."—H. C. C.]

PÆDIATRICS.

UNDER THE CHARGE OF

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OF PHILADELPHIA.

THE RADICAL CURE OF INGUINAL HERNIA IN YOUNG INFANTS.

UNTIL quite recently the general teaching of systematic writers on the subject has been adverse to operating for the radical cure of hernia in very young children. Berger, for instance, basing his opinion upon the frequency of cure by the bandage, deprecated operation upon such subjects. More recent writers, however, have brought forward evidence to justify this operation without reference to the age of the child. FÉLIZET, in his thesis (1891), has reported a successful double operation upon a child of eight months, the interference being necessitated by the enormous size of the hernial tumors. BROCA (*Revue mens. des Maladies de l'Enfance*, April, 1892) does not hesitate to operate after the age of three years, and his seven observations show that the operation itself is not a grave one, and its results can be compared to those obtained in adults. Below the age of two years he does not think operation is justifiable, because the phenomena of strangulation are never grave, and, moreover, antisepsis is difficult to maintain. KAREWSKI (*Berliner klinische Wochenschrift*, March 18, 1891), however, thinks that scrotal hernias can be radically treated without danger, even in infants of the tenderest age. Of the nine children upon whom he thus operated, the youngest was nine months and the oldest two years and three months. In none of these cases did relapse occur, and all recovered without accident. The most recent report of cases comes from PHOCAS, of Lille (*Le Mercredi Médical*, 1892, No. 29, p. 341), who gives the notes of two operations, one upon a child of fifteen months, the other upon an infant of four months, both of which gave eminently successful results. This author puts himself in line with the operators already quoted; but he is disposed to believe the conditions changed when the radical operation is practised as the termination of a kelotomy for strangulated hernia, for in this case the tissues are infected and the child in a

depressed state; and he considers these facts as warrant for refraining from operation in case of strangulation in children under two years of age. Such a decision, moreover, seems justified by the fact, noted by all observers, that strangulation at this age is a relatively benign accident. In many cases simple taxis is sufficient, and sometimes the condition yields spontaneously. Nevertheless the diagnosis of strangulation is surrounded by so many difficulties in these very young subjects, that statistics have little weight. On the other hand, the existence of a hernia, which cannot be satifactorily controlled by any of the palliative means, is a source of so much annoyance and suffering to the infant that measures for radical relief are, in many cases, peremptorily demanded. The operation promises better success, of course, when practised in the absence of strangulation, and the author would not hesitate to reduce a strangulated hernia by taxis, waiting for a more favorable time to attempt the radical cure. As a general rule he believes it to be sufficient to extirpate the peritoneo-vaginal canal, whose abnormal persistence is the sole cause of this hernial defect.

The Anæmia of Hereditary Syphilis.

Johann Loos (*Wiener klinische Wochenschrift*, 1892, No. 20, p. 291) concludes a paper upon this subject with the following: Hereditary syphilis is always associated with an anæmia which, under some conditions, may reach an extreme degree of intensity. This anæmia is characterized by a diminution in the number of the red blood-corpuscles; by a quite marked alteration in these corpuscles; the appearance of megalo- and microcytes; by the appearance of nucleated erythrocytes, sometimes in quite notable quantity. It is also characterized by the constant existence of a leukocytosis, which may often become extreme, and by the appearance of myelo-plaques in the blood. This anæmia is a very important and significant symptom of the disease, and may directly occasion a fatal issue.

There are only two diseases common to childhood in which the alterations of the blood suggest the changes above described, and these are splenic anæmia (the "anæmia infantum pseudo-leukæmica" of Von Jaksch) and forms of severe rhachitis.

Corrigendum.—The initials E. P. D. were unintentionally omitted from the review "Recent Obstetric Literature," pp. 705–707, December Journal, 1892.

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